



TransWest Express Transmission Project

Colorado Greater Sage-Grouse Mitigation Plan

March 2023



TRANSWEST EXPRESS TRANSMISSION PROJECT COLORADO GREATER SAGE-GROUSE MITIGATION PLAN

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ACRONYMS AND ABBREVIATIONS

AC	alternating current
ARMPA	approved resource management plan amendment
AIM	Assessment, Inventory, and Monitoring
BLM	Bureau of Land Management
Northwest Colorado GRSG ARMPA	<i>Bureau of Land Management Northwest Colorado Greater Sage-Grouse Approved Resource Management Plan Amendment</i>
Colorado Conservation Plan	<i>Colorado Greater Sage-Grouse Conservation Plan</i>
CPW	Colorado Parks and Wildlife
DC	direct current
DSAYs	discounted service-acre-years
EO	Executive Order
FEIS	final environmental impact statement
GHMA	General Habitat Management Area
GRSG	greater sage-grouse
Framework	<i>Bureau of Land Management Greater Sage-Grouse Mitigation Framework Plan</i>
HEA	Habitat Equivalency Analysis
IM	Instructional Memorandum
km	kilometer
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
OC	oversight committee
PHMA	Priority Habitat Management Area
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
Rocky Mountain Region ROD and ARMPAs	<i>Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region, Including the Greater Sage- Grouse Sub-Regions of Lewistown, North Dakota, Northwest Colorado, Wyoming and the Approved Resource Management Plans for Billings, Buffalo, Cody, HiLine, Miles City, Pompeys Pillar National Monument, South Dakota, and Worland</i>
ROD	Record of Decision
ROW	right-of-way
TAG	Technical Advisory Group
SAP	Colorado State Land Board <i>Greater Sage Grouse Stewardship Action Plan</i>
TransWest	TransWest Express LLC

TWE Project	TransWest Express Transmission Project, also Project
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WAPA	Western Area Power Administration

KEY COMPONENTS OF A MITIGATION PLAN: EVALUATION MATRIX

TransWest Express LLC (TransWest) has prepared this Colorado Greater Sage-Grouse Mitigation Plan (Colorado Plan) in accordance with Bureau of Land Management (BLM) requirements set forth in the TransWest Express Transmission Project's (TWE Project's) Record of Decision (ROD), Appendix F, *Notice to Proceed Process and Mitigation and Monitoring Requirements* and its Attachment F.1 *BLM Greater Sage-Grouse Mitigation Framework Plan* (Framework). Appendix F of the ROD describes BLM's process for evaluating monitoring and mitigation requirements prior to issuance of the Notice-to-Proceed for construction of the TWE Project. Attachment F.1 describes the process for developing and evaluating the adequacy of TransWest's Greater Sage-Grouse Mitigation Plan (Plan).

TransWest developed this Colorado Plan to achieve the mitigation standards identified in Attachment F.1 using technical attributes and principles and standards of mitigation to demonstrate adequate avoidance, minimization, and compensatory mitigation for the TWE Project. The measures described in this Colorado Plan are based on the best available science and recommendations of the Technical Advisory Group (TAG) established during BLM's National Environmental Policy Act (NEPA) process to review TransWest's proposed mitigation approach.

The Framework is intended to assist TransWest in the development of this Colorado Plan and describes the specific standards and assumptions necessary to demonstrate that appropriate compensatory mitigation has been provided to offset the impacts to greater sage-grouse (*Centrocercus urophasianus*) that result from construction and operation of the TWE Project. The Framework requires that TransWest's mitigation plan address the Key Components of Mitigation Plan to ensure consistency with U.S. Department of Interior Manual 600 DM 6 (Landscape-Scale Mitigation Policy). The Framework also requires that TransWest's mitigation plan describe how the compensatory mitigation project(s) used to offset TWE Project impacts achieve the Principles and Key Attributes of Compensatory Mitigation detailed in the Framework.

To support BLM's review of this Colorado Plan, TransWest has developed the TWE Project Greater Sage-Grouse Mitigation Plan Evaluation Matrix to provide a cross-reference to the location in this Colorado Plan where the Key Components of a Mitigation Plan, Principles of Compensatory Mitigation, and Key Attributes of Compensatory Mitigation are addressed. The TWE Project Greater Sage-Grouse Mitigation Plan Evaluation Matrix on the following page identifies each Key Component as it is written in the Framework and lists the Principles and Key Attributes of Compensatory Mitigation. Each Key Component, Principle, and Key Attribute has been assigned a cross-reference code to allow reviewers to cross-reference the section(s) in this Colorado Plan or Attachment that demonstrates consistency with the Framework requirements. A text box has been added to each of the Colorado Plan sections identified in the evaluation matrix to allow reviewers to identify which Key Components, Principles, or Key Attributes are addressed in that section.

1 **TWE PROJECT GREATER SAGE-GROUSE MITIGATION PLAN EVALUATION MATRIX**

Key Component, Principle, or Key Attribute of Mitigation	Cross Reference Code	Mitigation Plan Section
Component		
Type of resource(s) and its value(s), service(s), function(s), and amounts(s) of such resource(s) to be provided (usually expressed in acres or some other physical measure); the method of compensation (restoration, establishment, enhancement, preservation); and the manner in which a landscape-scale approach has been considered	C1	Section 2.1 Section 2.2 Section 2.4 Section 2.5 Section 3.1 Section 3.3 Attachment C
The methodology used to determine the expected debits and credits and mitigation ratios applied (as applicable)	C2	Section 2.2 Section 2.3 Section 2.4 Attachment C
Factors considered during the compensatory site selection process.	C3	Section 2.1 Section 3.3
Compensatory mitigation site protection instruments to ensure resource and administrative durability of the measure	C4	Section 3.1 Section 4.2
Baseline information and the demonstrated additionality of the measure	C5	Section 2.4 Section 2.5 Section 4.12 Attachment C
The mitigation value of such resources, including a rationale (e.g., accounting system with metrics and methods) for such a determination	C6	Section 2.5 Attachment C
A mitigation work plan, including the geographic boundaries of each compensatory mitigation project, construction methods, timing, responsible party(ies), and other considerations	C7	Section 3.0
A maintenance plan	C8	Section 4.4 Section 4.5
Performance standards to determine whether a compensatory mitigation measure has achieved its intended outcome	C9	Section 3.4
Monitoring requirements	C10	Section 4.4
Long-term management	C11	Section 4.3 Section 4.4 Section 4.5
Adaptive management commitments	C12	Section 4.5
Financial assurance provisions sufficient to ensure, with a high degree of confidence, that a compensatory mitigation measure will achieve and maintain its intended outcome, in accordance with the compensatory mitigation measure's performance standards	C13	Section 2.5 Section 3.2
Description of the methodology to determine the expected debits and credits based on the habitat equivalency analysis (HEA) and technical advisory group (TAG) recommendations (Exhibit 1 [SWCA 2016]) related to 1) quantification of baseline conditions, 2) quantification of habitat service losses for direct and indirect effects, and 3) guidance regarding application of results to a mitigation package	C14	Section 2.2 Section 2.3 Section 2.4 Attachment C
Additional information provided as necessary to determine appropriateness, practicability, and equivalency of compensatory mitigation projects, particularly as they related to the principles, standards, and technical elements described below	C15	See below
Principles of Compensatory Mitigation		
Duration	P1	Section 4.1
Durability	P2	Section 4.2
Mitigation measures and project outcomes, performance standards, metrics and accounting	P3	Section 4.3
Effectiveness monitoring	P4	Section 4.4
Adaptive management	P5	Section 4.5
Reporting	P6	Section 4.6

Key Component, Principle, or Key Attribute of Mitigation	Cross Reference Code	Mitigation Plan Section
Responsible parties	P7	Section 4.7
Best available science	P8	Section 4.8
Managing Risk and Uncertainty	P9	Section 4.9
Reasonable Relationship	KA1	Section 4.10
Timeliness	KA2	Section 2.6 Section 4.11
Baseline and Additionality	KA3	Section 4.12

Source: BLM Greater Sage-Grouse Mitigation Framework Plan (BLM 2016)

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1.0 INTRODUCTION

TransWest Express LLC (TransWest) intends to construct, operate, and maintain the TransWest Express Transmission Project (TWE Project, or Project). The TWE Project is a high-voltage transmission system that will extend across four states from south-central Wyoming to southern Nevada. The Project will include approximately 735 miles of transmission line, two terminals located in Wyoming and Utah, and two substations located in Utah and Nevada. The Project will be capable of transmitting 3,000 megawatts of electric energy (enough to power more than 1,800,000 homes) and will incorporate both high-voltage direct current (DC) and high-voltage alternating current (AC) technology. The DC System will transmit power from Wyoming, across Colorado to Utah with maximum efficiency, and the AC System will transmit power from Utah to southern Nevada with the flexibility to connect with other systems along the route. Converter stations at both the Wyoming and Utah Terminals will allow the TWE Project's DC System to interconnect with other local AC Systems.

The Project has undergone National Environmental Policy Act (NEPA) review, and the *TransWest Express Transmission Project Final Environmental Impact Statement* (FEIS) was published by the Bureau of Land Management (BLM) and Western Area Power Administration (WAPA) in April 2015 (BLM and WAPA 2015). BLM, U.S. Forest Service (USFS), WAPA, and U.S. Bureau of Reclamation subsequently issued Records of Decision (RODs) approving the Project (BLM 2016; U.S. Bureau of Reclamation 2017; USFS 2017; WAPA 2017). The Utah Reclamation Mitigation and Conservation Commission (URMCC) has not yet issued a NEPA decision for use of lands under their administration needed for the Project. BLM serves as the lead federal agency for the TWE Project.

A more-detailed description of the Project is provided in the *TransWest Express Transmission Project Notice to Proceed Plan of Development* (POD) (TransWest 2023). The POD also provides additional information on the Project's purpose and need; proposed route; facilities; construction, operation, and maintenance; and applicant-proposed environmental protection measures.

1.1 Document Purpose

This Colorado Greater Sage-Grouse Mitigation Plan (Colorado Plan) addresses the requirements established in the BLM ROD (BLM 2016), including the *BLM Greater Sage-grouse Mitigation Framework Plan* (Framework) (BLM 2016:Appendix F, Attachment F.1), and applicable federal and state policies that relate to greater sage-grouse (*Centrocercus urophasianus*) (GRSG) mitigation in Colorado. This Colorado Plan summarizes Project measures used to avoid and minimize impacts to GRSG habitat to the extent practicable and to compensate for unavoidable direct and indirect impacts in accordance with the BLM ROD.

1.2 Requirements for Mitigation

The development and evaluation of the Project has included extensive coordination on the part of TransWest, BLM, USFS, U.S. Fish and Wildlife Service (USFWS), the State of Colorado, local governments, and other stakeholders to accomplish the Project purpose and need while preventing any unnecessary or undue degradation of the land, including GRSG habitat. Through this cooperative process, mitigation requirements were developed and established in the BLM ROD; these requirements are incorporated in this Colorado Plan. The Project-specific mitigation established in this Colorado Plan is consistent with the requirements of the following approved resource management plan amendments (ARMPAs).

- *Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region, Including the Greater Sage-Grouse Sub-Regions of Lewistown, North*

Dakota, Northwest Colorado, Wyoming and the Approved Resource Management Plans for Billings, Buffalo, Cody, HiLine, Miles City, Pompeys Pillar National Monument, South Dakota, and Worland (referred to hereafter as the Rocky Mountain Region ROD and ARMPAs) (U.S. Department of the Interior BLM 2015; 80 *Federal Register* 57639)

- *Bureau of Land Management Northwest Colorado Greater Sage-Grouse Approved Resource Management Plan Amendment* (referred to hereafter as the Northwest Colorado GRSGARMPA) (U.S. Department of the Interior BLM Northwest Colorado District Office Colorado State Office 2015)

The Northwest Colorado GRSG ARMPA clearly specifies that the land use plan amendments and the management directions for realty action decisions do not apply to several priority transmission projects, including the TWE Project. While the management decisions in the Northwest Colorado GRSG ARMPA do not apply to the Project, through the Project's NEPA analysis BLM identified conservation measures for GRSG that are similar to those established in the Northwest Colorado GRSG ARMPA. These measures have been determined to achieve a net conservation gain¹, as demonstrated in this Colorado Plan (U.S. Department of the Interior BLM Northwest Colorado District Office Colorado State Office 2015).

Other regulatory guidance incorporated into this Colorado Plan, as applicable, is listed below.

- Instruction Memorandum (IM) 2018-021: Gunnison and Greater Sage-Grouse (Including the Bi-State Distinct Population Segment) Habitat Assessment Policy (BLM 2017a)
- IM 2021-038: Rescinding IM No. 2019-018, Compensatory Mitigation
- IM 2021-046: *Reinstating the Bureau of Land Management (BLM) Manual Section (MS-1794) and Handbook (H-1794-1) on Mitigation*
- U.S. Department of the Interior Secretarial Order No. 3353: *Greater Sage-Grouse Conservation and Cooperation with Western States* (U.S. Department of the Interior 2017)
- *Greater Sage-Grouse Range-Wide Mitigation Framework* (USFWS 2014)
- *Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report* (USFWS 2013)
- *Greater Sage Grouse Stewardship Action Plan* (Colorado State Land Board 2016)

Collectively, these documents provide guidance for GRSG habitat management and mitigation for the Project in Colorado.

1.2.1 TransWest Express Transmission Project Record of Decision

TransWest and BLM, in coordination with USFWS and Colorado Parks and Wildlife (CPW), established a mitigation process to avoid and minimize Project-related impacts to GRSG and to provide compensatory mitigation for remaining impacts. This process is described in the FEIS and ROD and associated documents, specifically the Framework (BLM 2016:Appendix F) and the TWE Project POD (TransWest 2023).

In Colorado, the mitigation standard that applies to this Project as conveyed in the Project ROD and the Framework is as follows (BLM 2016).

¹ The BLM defines net conservation gain [or net benefit] as being met when mitigation results in an improvement above baseline conditions [BLM 2021a].

- In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that resulting habitat loss and degradation, BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.

Consistent with the Framework and ROD-required mitigation standards, TransWest provided detailed information about quantifying compensatory mitigation requirements through the use of a habitat equivalency analysis (HEA). The Framework states that the Project must use the HEA, which is a “science-based, peer-reviewed method for quantifying interim and permanent habitat injuries, measured as a loss of habitat services from pre-disturbance conditions, and scaling compensatory habitat requirements to those injuries.” On March 3, 2016, TransWest convened a Technical Advisory Group (TAG) to review the proposed HEA approach. BLM reviewed and accepted the TAG recommendations and specified their inclusion into TransWest’s HEA as a mandatory component of the Project’s mitigation planning process (BLM 2016:Appendix F).

In addition to, and as a part of, mitigation for the Project, the BLM ROD requires tubular steel monopole structures be installed on federal land within Priority Habitat Management Areas (PHMAs) where not co-located with other transmission infrastructure (approximately 11 miles) in Colorado, as practicable from an engineering perspective (Figure 1). Due to the reduced number of horizontal cross arms in comparison to the lattice structure, tubular monopole structures may be more easily managed (e.g., through detecting and removing nests) to discourage avian predators from perching and nesting.

The BLM ROD Framework also requires that this Colorado Plan be reviewed by an appropriate group of federal and cooperating agencies to ensure that the mitigation standard for the Project will be achieved. TransWest and BLM have convened an oversight committee (OC) of GRSG experts and species managers to evaluate this Colorado Plan (Attachment A).

1.2.2 State of Colorado

In addition to the Rocky Mountain Region ROD and ARMPAs (U.S. Department of the Interior BLM 2015; 80 *Federal Register* 57639), various other documents are used by state agencies to define state-specific standards and frameworks for GRSG mitigation. The State of Colorado developed the *Colorado Greater Sage-Grouse Conservation Plan* (Colorado Conservation Plan) designed to increase the abundance and viability of the species and its habitat throughout the state (Colorado Greater Sage-Grouse Steering Committee 2008). The 2008 Colorado Conservation Plan describes the primary issues for GRSG with respect to new infrastructure (e.g., power lines) and the recommended strategies for addressing the identified issues. Additionally, the State of Colorado (Colorado State Land Board) developed a Greater Sage Grouse Stewardship Action Plan (SAP) to support statewide efforts to protect and improve GRSG habitat (Colorado State Land Board 2016). The SAP includes a requirement to mitigate for adverse impacts to GRSG habitat on state trust lands caused by certain uses, including rights-of-way (ROWs).

A summary of how the compensatory mitigation presented in this Colorado Plan aligns with applicable state guidance is provided in Section 5.0.

2.0 RECORD OF DECISION REQUIRED MITIGATION

2.1 Mitigation Approach

Evaluation Matrix Cross-Reference Code(s): C1, C3

The conservation measures analyzed through the Project's NEPA process include 1) implementation of a mitigation hierarchy defined by actions of avoidance, acknowledging that the primary mission is avoiding impacts to and protecting the best remaining habitat for GRSG; 2) minimization, attempting to minimize impacts where they cannot first be avoided; and 3) when unavoidable impacts remain, compensation for any residual impacts that may affect GRSG. The mitigation hierarchy applied to the Project (Attachment B) is described below in both a general and a Project-specific context.²

- *Avoidance*: includes measures taken to avoid impacts altogether by not taking a certain action or parts of an action. Avoidance measures applied to the TWE Project include reviewing each route's potential impacts on sensitive resources prior to considering the route for detailed analysis. Project-specific avoidance measures include:
 - To limit disturbance to lekking and nesting activity, disruptive construction and maintenance activities within 4 miles of occupied/active leks will be prohibited between March 1 and June 30. Activities determined to be non-disruptive by the BLM, Western, and applicable federal and state land and wildlife management agencies will be permitted between March 1 and June 30 (SSWS-5.4).
 - To reduce potential impacts on greater sage-grouse lek integrity, NSO will be applied within a 0.6 mile radius of a lek site. The NSO area may be altered depending upon the active status of the lek, habitat characteristics, or the geographical relationship of topographical barriers and vegetation screening to the lek site (ID-BLM-52).
 - This area encompasses sage grouse leks. Surface Occupancy is not allowed within 1/4 mile of identified lek sites (ID-BLM-67).
 - Greater sage-grouse: To prevent disturbing up to 75 percent of nesting birds, between March 1 and June 30, greater sage-grouse nesting and early brood-rearing habitat (Map 5) will be stipulated as CSU for oil and gas operations and avoidance areas for other surface disturbing activities within a 4 mile radius of the perimeter of a lek. All surface disturbing activities will avoid only nesting and early brood-rearing habitat within the 4 mile radius of the lek during this time period. Exceptions, modification, or waivers will be granted according to criteria established in Appendix B. The actual area to be avoided will be determined on a case-by-case basis, depending on applicable scientific research and site-specific analysis and in coordination with commodity users and other appropriate entities (ID-BLM-230).
 - Crucial winter habitat will be closed from December 16 to March 15 (ID-BLM-231).
 - This area encompasses sagebrush habitats that are occupied by wintering concentrations of grouse, or represent the only habitats that remain available for use during periods of heavy snowpack. No development activity will be allowed between December 16 and March 15 (ID-BLM-248).

² The bulleted list provided here was copied verbatim from the ROD (BLM 2016).

- 1 • *Minimization*: includes measures taken to minimize impacts by limiting the degree or
2 magnitude of the action and its implementations. Project-specific minimization measures
3 include:
 - 4 ○ Placement of Project structures and access roads maximizes use of topographic features
5 to visually screen Project facilities from high quality greater sage-grouse habitat (SSWS-
6 5.1).
 - 7 ○ To minimize fragmentation TransWest's design in suitable sage-grouse breeding, brood-
8 rearing, and wintering habitats, uses existing roads, minimizes creation of new roads, will
9 be accessed via drive and crush wherever practicable, and has been micro-sited in
10 coordination with applicable state and federal wildlife management (SSWS-5.2).
 - 11 ○ To limit corvid predation on greater sage-grouse, TransWest has developed a Raven
12 Management Plan that outlines active adaptive management strategies for controlling
13 raven predation and nesting within the Project ROW and includes post-construction
14 monitoring for ravens and removal of raven nests (SSWS-5.3).
 - 15 ○ To limit the potential for adverse impacts resulting from contact with construction
16 equipment, vehicles, and personnel, TransWest will implement a vehicle speed limit of
17 15 mph on roads without posted speed limits in areas of occupied sage-grouse habitat
18 (SSWS-5.5).
 - 19 ○ TransWest has developed a Noxious Weed Management Plan in accordance with existing
20 BLM Pesticide Use Plan requirements. Control of noxious weeds would minimize the
21 potential for weed-related degradation of occupied sage-grouse habitat. Prior to the use of
22 chemical weed control agents, herbicide applications would be reviewed by agency
23 wildlife biologists to ensure consistency with state and local greater sage-grouse
24 conservation goals ((ROD-F-01, SSWS-5.6).
 - 25 ○ Additional measures identified by the BLM and Western for consideration on a site-
26 specific basis in coordination with appropriate federal and state agencies will include
27 (SSWS-5.8):
 - 28 – Self-supporting tubular steel monopole structures will be installed on federal lands
29 that intersect with 11 miles of greater sage-grouse Priority Habitat Management Area
30 (PHMA) in Colorado where there are no existing above-ground large transmission
31 structures
 - 32 – TransWest will install guy wire marking devices on all guyed transmission structures
33 located in suitable sage-grouse habitat on federal lands to increase the visibility of
34 each wire and reduce the risk of collision by flying greater sage-grouse.
 - 35 ○ (Figure ROD F-01, SSWS-5.8). Within the 11 miles of greater sage-grouse PHMA in
36 Colorado, special engineering considerations guides structure needs at the Yampa River
37 crossing (ROD-F-01, SSWS-5.8).
 - 38 ○ TransWest's Avian Protection Plan (APP) identifies the nest management and monitoring
39 measures that will reduce avian predation. Measures identified in the APP include
40 application of perch deterrents, guy wire markings, effectiveness monitoring, and
41 adaptive management (ROD-F-05).
- 42 • *Compensatory mitigation*: includes compensation for an impact by replacing or providing
43 substitute resources or environments (40 Code of Federal Regulations 1508.20).
44 Compensatory mitigation includes compensation for remaining unavoidable impacts after all
45 appropriate and practicable avoidance and minimization measures have been applied, by
46 replacing or providing substitute resources or environments through the restoration,
47 establishment, enhancement, or preservation of resources and their values, services, and
48 functions.

Attachment B, Table B-1 lists the avoidance and minimization measures established in the BLM ROD. Attachment B, Table B-2 provides additional measures identified by TransWest that further align with applicable federal and state policies. Resource and detailed maps in POD Appendix AA, Map Sets, illustrate the locations of the avoidance and minimization measures that have a spatial component.

Many of the Project's initial avoidance and minimization efforts were documented as part of BLM's NEPA process and are described in the ROD. Specifically, the ROD identified that the following avoidance and minimization measures were used as criteria to establish BLM's Selected Alternative and issue the TWE Project ROW.

- The TWE Project maximizes the use of appropriate (e.g., non-underground-only) existing designated utility corridors by locating within or paralleling areas of existing utility ROWs.
- Through the implementation of design features and agency and applicant committed measures and BMPs, the Project avoids or minimizes resource impacts that are regulated by law including impacts to GRSG.
- The TWE Project minimizes the need for plan amendments through maximizing conformance to current land use plans. This includes application of applicable NSOs and timing stipulations for GRSG.
- The TWE Project alignment minimizes impacts to GRSG habitat.

BLM found that, as a result of implementation of the previous items as well as other avoidance, minimization, and mitigation measures, consistent with 40 Code of Federal Regulations (CFR) 1505.2(c), all practicable measures to avoid or minimize environmental harm from the TWE Project were adopted and included in the ROD.

Following issuance of the ROD, TransWest continued to avoid and minimize impacts to intact sagebrush landscapes and GRSG. Within the Project's authorized ROW, TransWest has designed the road network to take advantage of existing roads and has micro-sited Project infrastructure to further avoid and minimize impacts to PHMA and GHMA habitats and GRSG populations where practicable within the authorized ROW for the Project.

Following application of the avoidance and minimization measures and processes described above, TransWest determined that direct and indirect impacts of the TWE Project remain such that compensatory mitigation is necessary per the requirements of the ROD. The Project ROD requires compensatory mitigation for the direct and indirect effects to GRSG and its habitats in PHMA and GHMA. Accordingly, TransWest developed this Colorado Plan following the mitigation approach identified in the FEIS, BLM ROD, and Northwest Colorado GRSG ARMPA to achieve a net conservation gain in PHMAs and GHMAs (i.e., mitigation standard). Direct and indirect impacts located in the assessment area will be quantified through use of the HEA and offset with compensatory mitigation. The assessment area is defined as polygons of BLM-administered PHMAs and GHMAs that are intersected by the Project footprint out to 10 kilometers (km) from the Project centerline.

Where monopoles are installed, the HEA will quantify and scale mitigation to offset indirect impacts associated with construction and avoidance (out to 600 meters) as described in Attachment C; indirect impacts associated with decreased population growth (out to 10 km) as described in Attachment C will not be quantified as the monopole structures themselves are a direct form of mitigation intended to reduce raptor and raven perching and nesting. Where standard structures are installed within the approximate 11-mile area within the PHMAs (e.g., private land), the HEA will quantify and scale mitigation to offset indirect impacts out to the full indirect effect zones described in Attachment C.

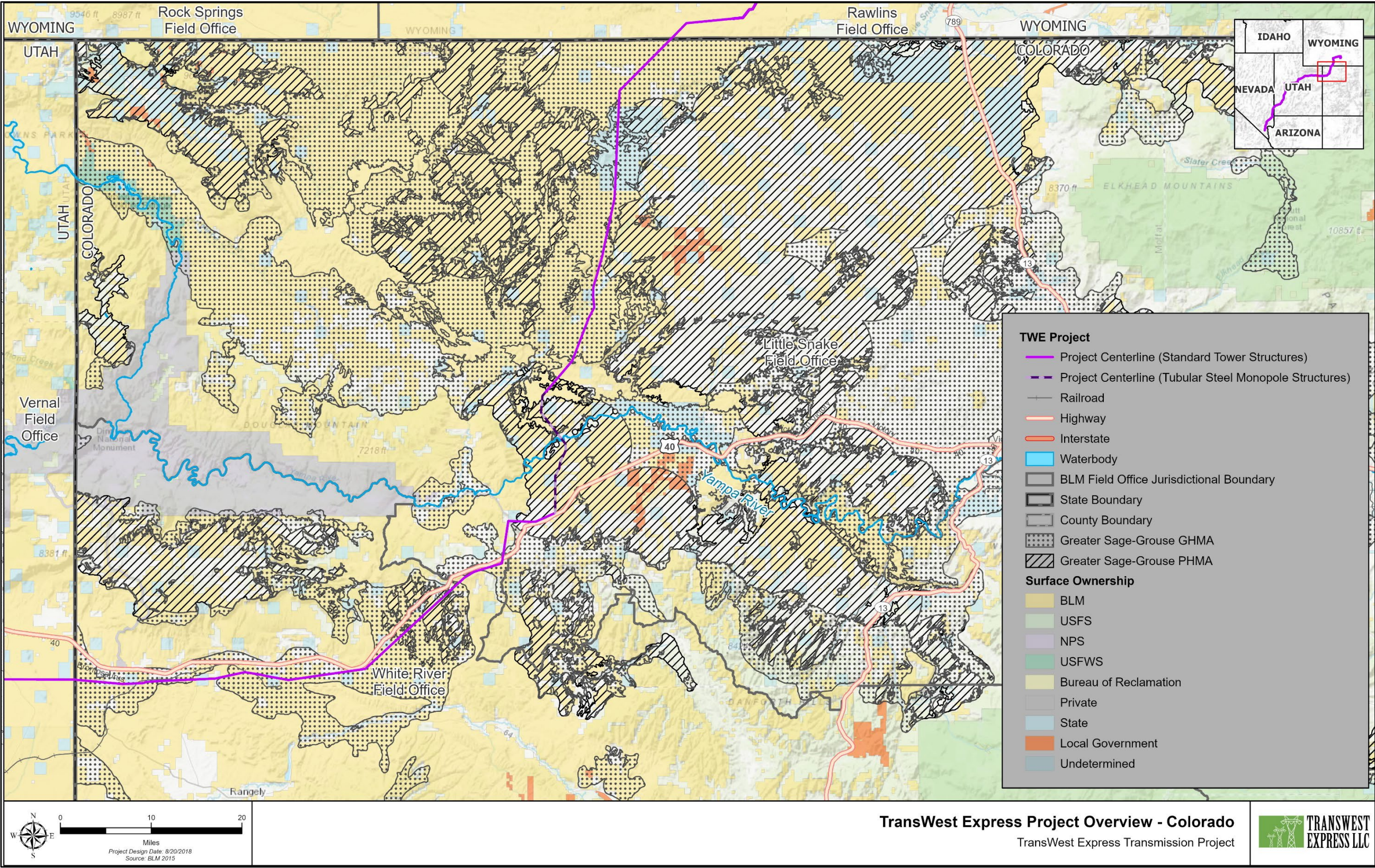


FIGURE 1 OVERVIEW OF THE TWE PROJECT: COLORADO SEGMENT

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2.2 Habitat Equivalency Analysis

Evaluation Matrix Cross-Reference Code(s): C1, C2, C14

HEA is a science-based, peer-reviewed method of quantifying interim and permanent habitat injuries (measured as a loss of habitat services from pre-disturbance conditions) and scaling compensatory habitat requirements to those injuries (Allen et al. 2005; Dunford et al. 2004; King 1997; Kohler and Dodge 2006; National Oceanic and Atmospheric Administration [NOAA] 2006, 2009). Habitat services are those ecosystem features (i.e., physical site-specific characteristics of an ecosystem) and ecosystem functions (i.e., biophysical processes that occur within an ecosystem) that support wildlife and human populations (King 1997).

Habitat services are generally quantified using a metric that represents the functionality or quality of habitat (i.e., the ability of that habitat to provide wildlife “services” such as nest sites, forage, and cover from predators, etc.). When wildlife habitat is the primary service of interest, areas with the highest habitat service levels are those areas with highest habitat quality. Interim (or short-term) habitat injuries are those services that are absent during certain phases of a project that would have been available if that disturbance had not occurred (e.g., temporary vegetation losses, temporary soil partitioning, and temporary displacement of wildlife populations). Permanent habitat injuries are those habitat injuries remaining after project completion and interim reclamation and recovery are complete (e.g., permanent vegetation loss, permanent loss of wildlife or fisheries populations, and irrecoverable impacts to soils or water because of contamination).

HEA uses a service-to-service approach to scaling. HEA does not assume a one-to-one trade-off in resources (e.g., number of acres). Rather, HEA balances the number of services lost with those that are gained because of conservation activities (NOAA 2006). For example, 1 acre of land with a diverse vegetative structure and abundant tree canopy can support higher numbers of nesting songbirds (an example of a habitat service of interest) than can 1 acre of land with few trees and little vegetative diversity. The two land parcels, although equal in size, provide unequal habitat services.

2.2.1 What Habitat Equivalency Analysis Does?

Evaluation Matrix Cross-Reference Code(s): C2

HEA is an economics model that:

- quantifies current habitat services provided in a project area or landscape (commonly referred to as the baseline habitat service level);
- quantifies the interim and permanent injuries to the baseline habitat service level; and
- determines appropriate scaled restoration and conservation activities to offset habitat services lost because of project impacts.

2.2.2 Benefits of Habitat Equivalency Analysis

The benefits of a HEA economics model are listed below.

- High credibility; the approach has been evaluated and documented in scientific peer-reviewed literature and has held up in numerous court cases.
- Analyses are quantitative rather than qualitative in nature.
- Equations are straightforward but have enough input variables to allow flexibility in project design.

- Provides a replicable method for calculating mitigation, acceptable compensatory restoration, and/or fines.
- Valuable planning tool; can be used to evaluate the cost of multiple compensatory mitigation measures.
- Applicable to any ecosystem type where an appropriate habitat services metric can be defined.
- The methods are currently the most commonly used by natural resource trustees to assess damages to ecosystems.
- HEAs are used by federal regulatory agencies, including USFWS, NOAA, BLM, U.S. Environmental Protection Agency, U.S. Department of the Interior, and U.S. Army Corps of Engineers.

2.2.3 When to Use a Habitat Equivalency Analysis

Based on Chapman (2004), HEA is an appropriate tool for scaling mitigation when the conditions listed below exist.

- Habitat services can be defined or modeled
- Quantification of project impacts is possible
- Replacement of services lost is feasible
- Conservation methods are sufficiently known

2.2.4 Compensation Components

Compensation for impacts includes two components: 1) recovery of the habitat services lost from construction and operation of the project (primary restoration) and 2) compensation for the interim and permanent loss of habitat services occurring prior to full recovery (compensatory mitigation). HEA quantifies the habitat services lost during the lifetime of a project compared to baseline and scales the compensatory project (mitigation project) so that it provides services that are equal to that loss. The term baseline refers to the condition of the resources and quantity of habitat services that would have existed had the disturbance not occurred. The quantity of services lost depends on the extent of the injury and time required for restoration; actions taken to accelerate the rate of primary restoration would decrease the interim loss of habitat services, requiring less compensatory mitigation (e.g., frontloading mitigation).

2.2.5 Measuring Habitat Services (Ecological Economics)

Quantifying the services provided by an ecosystem is a complex task. This complexity can be managed through the use of an attribute, or metric, that provides a measure of the services of interest. The metric must be able to capture the relative differences in the quality and quantity of services being provided before and after restoration and between primary and compensatory sites (NOAA 2009).

Measurements of habitat services over the lifetime and area of a project used in the HEA have three components: land area, service level, and time. The relative service level can be quantified using a metric that measures or scores one or more key habitat elements for a species or wildlife community of interest (e.g., vegetation stem density, vegetation type, nest density, percentage of canopy cover, and proximity to critical habitat). Habitat services are commonly expressed in service-acres (1 year) or service-acre-years (multiple years).

2.3 Quantification of Habitat Service Losses

Evaluation Matrix Cross-Reference Code(s): C1, C2, C5, C14

The HEA process for the Project has been developed in close coordination with the TAG and a Project-specific OC, which consists of agency expert biologists and stakeholder Project-specific planners (Attachment A). This coordination provided a transparent stakeholder engagement process and ensures that the best available scientific data was used, the habitat service metric is appropriate for resources in the Project, the results of the HEA are understood, and the compensation offsets the interim and permanent loss of habitat services modeled. The steps detailed below have been completed as part of the development of the HEA for the Project. For more information on how debits and credits are calculated, refer to Attachment C.

2.3.1 Quantifying Baseline Habitat Services

TransWest used the TAG and OC-approved habitat services metric to quantify the baseline GRSG habitat services available prior to Project construction. The baseline refers to the habitat services available to GRSG before Project disturbance. Attachment C provides detailed information related to the development of the habitat services metric that served as the basis for quantifying baseline habitat services and determining Project impacts and appropriate mitigation. The Gateway South Transmission Line Project was included in the baseline habitat service calculations for the TWE Project because it is currently under construction and can be considered for co-location³.

2.3.2 Quantification of Project Impacts (Debits)

The habitat service losses were calculated using the final Project design and Project construction schedule. The footprint of the Project was provided electronically by TransWest. The footprint files specified the locations of direct disturbance associated with new access roads, transmission towers, pulling/tensioning areas, substations, and other ancillary facilities. The construction schedule provided by the TransWest for the Project indicates that construction will be completed in Year 1 with active restoration and Project operation beginning in Year 2; recovery will take up to 100 years, depending on disturbance and vegetation types (see Attachment C for more detail on milestones).

Permanent and interim losses of habitat services anticipated with the construction and operation of the Project were quantified using methods described in Attachment C. Habitat service losses are expressed in present value as the discounted service-acre-years (DSAYs) lost or gained, which is the sum of the permanent and temporary losses and gains over the lifetime of the Project with the economic discount rate applied. These results, provided below, were used to scale mitigation.

The modeled habitat service level at each of the Project milestones was used in HEA calculations to quantify the present value of the habitat services lost over the lifetime of the Project. A summary of the estimated habitat service losses due to the Project's construction, operation, and maintenance are provided in Table 1 for the full assessment area (i.e., 10-km buffer around the Project footprint and centerline that is in PHMAs and GHMAs). These are the habitat service totals that will be offset with mitigation. Attachment C provides additional detail on the methods used to describe and quantify the modeled losses of habitat services (direct and indirect impacts) resulting from Project construction and operation.

³ Methods for considering co-location were developed and approved by the TAG and are described in the TWE Project ROD (BLM 2016 Appendix K: Greater Sage-Grouse Habitat Mitigation Plan)

TABLE 1 HABITAT SERVICES LOST IN THE ASSESSMENT AREA OVER THE 102-YEAR ASSESSMENT PERIOD

Measure	Value
Total Project length (km)*	123.5
Total Project footprint in assessment area (acres) [†]	952.8
Assessment area (acres) [‡]	493,895.5
Habitat services in the assessment area at baseline condition (DSAYs) [§]	173,471,661.1
Habitat services lost in the assessment area (DSAYs) [§]	1,185,529.4

* Length of Project through assessment area in PHMAs and GHMAs.

[†] Footprint of the Project inside PHMAs and GHMAs.

[‡] Polygons of PHMAs and GHMAs that are intersected by the Project footprint out to 10 km from the Project centerline.

[§] Summed over 102 years. Habitat services lost account for the impacts of construction, 30 years of Project operation under the current Right-of-Way (ROW) Grant (BLM 2017b), and gradual recovery of direct disturbances. Considers co-location with the Gateway South Transmission Line Project.

2.4 Debit/Credit Calculation

Evaluation Matrix Cross-Reference Code(s): C1, C5, C6, C14

In Colorado, TransWest is proposing compensatory mitigation through an in-lieu fee option provided for in the ROD to ensure the mitigation plan meets the ROD requirements to account for all direct and indirect effects on GRSB that may occur as a result of the Project and provide an overall net conservation gain. ROD required mitigation will be achieved through the following actions:

1. Project mitigation activities are to be within the Northwest Colorado greater sage-grouse populations in the Western Association of Fish and Wildlife Agencies Sage-grouse Management Zone, Northwest Colorado Biological Significant Unit (BSU) located in Moffat and Rio Blanco counties.
2. Using the HEA calculated DSAYs lost of 1,185,529.4 as the measure of the TWE Project-specific indirect and direct impacts that must be offset to achieve a no-net-loss of habitat services (i.e., returning habitat services to baseline conditions).
3. To achieve net conservation gain, BLM is requiring a 3:1 ratio applied to DSAYs lost on Included Lands. This results in a total of 3,556,588.2 DSAYs that are offset by the mitigation described in this Colorado Plan.
4. Providing additional funds for conservation easement acquisition and closing.
5. Providing additional funds to establish a 10% reserve account.

The Framework in the ROD requires that the Project provide a diverse portfolio of compensatory mitigation projects across land ownerships except where opportunities on private or non-federal lands are not readily available, or where federal land management policies require that impacts to public lands be mitigated on public lands. Following input from the TAG, the Project based its ROD-required mitigation calculations in Colorado on the following mix of mitigation projects:

- 80% conservation easements and/or acquisitions,
- 10% sagebrush habitat restoration
- 10% pinyon-juniper removal

Present day costs per DSAY gained were calculated by the BLM by adding 20% to the 2014 cost per DSAY gained values that were published in the TWE Project FEIS Appendix J, Exhibit J2, Table 7.4 Present-day adjusted costs per DSAY gained and mitigation costs per project type are presented in Table 2. In addition to the costs for offsetting DSAYs lost, a 10% reserve account and closing costs for expected conservation easements were included in final calculation of mitigation owed for TWE Project impacts (Table 2).

Following the procedures identified in the Project ROD and documented in Attachment C of this plan, the DSAYs lost in Colorado during construction, operation, maintenance, reclamation, and recovery of the Project were calculated to be 1,185,529.4 (Table 1). After applying BLM's required 3:1 ratio for DSAYs lost, providing reserve account fees, and including conservation easement closing costs, TransWest will transfer \$7,016,852.73 to the mitigation fund described in Section 3.0 to account for all direct and indirect effects on GRSG in Colorado (Table 2). The Project's mitigation fully accounts for all direct and indirect effects on GRSG in Colorado in accordance with the BLM's ROD, FEIS, and TAG guidance and provides for a diverse portfolio of compensatory mitigation projects.

TABLE 2. MITIGATION PROJECT PORTFOLIO AND COST FOR BLM-CALCULATED IMPACTS IN COLORADO.

Project Type	DSAYs Offset	Cost/DSAY	Total
Conservation easement	2,845,270.56	\$1.24	\$3,528,135.49
Sagebrush restoration	355,658.82	\$2.47	\$878,477.29
Pinyon-juniper removal	355,658.82	\$5.29	\$1,881,435.16
SUBTOTAL			\$6,288,047.94
+ 10% reserve			\$628,804.79
+ Conservation Easement closing costs (\$50,000 x 2)			\$100,000
TOTAL			\$7,016,852.73

Of the total compensatory mitigation fee, \$983,469.75 will be reserved for habitat enhancement projects on Colorado State Land Board land. This amount was calculated based off the proportion of the TWE centerline that intersects Colorado State Land Board land relative to the total length of the TWE centerline in Colorado (17.63 miles which equates to approximately 15% of the total centerline in Colorado). The remainder of the fund will be distributed according to the process described in Section 3.0.

TransWest's mitigation contributions achieve the ROD-required net gain standard and result in an approximate 34:1 mitigation ratio based on the long-term acres of Project-related disturbance in Colorado PHMAs and GHMAs relative to the acres of conservation easement necessary to offset Project direct, indirect, and residual impacts.

2.5 Mitigation Funding

Evaluation Matrix Cross-Reference Code(s): C13

Financial considerations for durability include assurances that financing will be sufficient to maintain, monitor, and implement compensatory mitigation projects for the duration of the impacts from the Project. The Project holds a 30-year ROW grant. As part of this Plan, TransWest will provide a one-

⁴ The BLM used the Consumer Price Index Inflation Calculator (https://www.bls.gov/data/inflation_calculator.htm) to adjust the values taken from TWE Project FEIS Appendix J, Exhibit J2, Table 7. The values were increased by 20% to: \$1.24 per conservation easement DSAY, \$2.47 per sagebrush restoration DSAY, and \$5.29 per pinyon-juniper removal DSAY.

time mitigation payment of \$7,016,852.73 to BLM. Of this, \$983,469.75 will be reserved for habitat enhancement projects on Colorado State Land Board land.

2.6 Timing of Mitigation Projects

Evaluation Matrix Cross-Reference Code(s): KA2

TransWest will provide compensatory mitigation through an in-lieu fee option which aligns with the mechanisms recognized in BLM MS-1794, H-1794-1 and the Project ROD. H-1794-1 defines recognized compensatory mitigation mechanisms as “a type of an arrangement where resources are restored, established, enhanced, and/or preserved (all of which may lead to accrual of credits) for the purpose of compensating for residual effects to resources from public land uses that warrant mitigation (which qualify as accrual of debits), and may include mitigation banks, mitigation exchanges, mitigation funds (also known as in-lieu fee programs), and public land user-responsible compensatory mitigation measures” (H-1794-1).

Through development and implementation of this Colorado Plan, TransWest commits to provide the funding and assurances for compensatory mitigation commensurate with unavoidable direct, indirect, and residual Project impacts to GRSG habitat as calculated in Section 2.5. TransWest will provide these compensatory mitigation funds prior to the initiation of Project disturbance as a condition of the Project’s notice-to-proceed. Any concerns or uncertainty of timeliness revolving around projects being implemented post-Project construction are mitigated by the net conservation gain ratio and the timely implementation and use of all funds (see Section 2.4 for more information).

2.7 Mitigation Oversight Committee

The BLM ROD and associated Framework established that this Colorado Plan be reviewed by an appropriate group of cooperating agencies to ensure that the mitigation standard for the Project will be achieved. An OC (Attachment A) consisting of a representative from each stakeholder agency including BLM, the State of Colorado, Moffat County, and TransWest has therefore been created to review this plan.

3.0 TRANSWEST EXPRESS TRANSMISSION PROJECT MITIGATION

3.1 Mitigation Mechanism

Evaluation Matrix Cross-Reference Code(s): C1

The BLM has entered into a *National Mitigation and Conservation Account Memorandum of Agreement* (Agreement) with the National Fish and Wildlife Foundation (NFWF) to establish a financial account (the National Mitigation and Conservation Account or NMC Account) to facilitate implementation of mitigation activities for fish, wildlife, plants, and their habitats, and other natural resources (either voluntary or specifically required by federal or state law) relating to BLM authorizations to use public lands (Attachment D: *National Mitigation and Conservation Account Memorandum of Agreement Between the Bureau of Land Management and the National Fish and Wildlife Foundation*). TransWest will transfer the mitigation funds calculated in Section 2.4 to the NMC Account via an in-lieu fee option.

NFWF, referred to herein as the Fund Administrator, is a charitable non-profit corporation established in 1984 by the National Fish and Wildlife Foundation Establishment Act, 16 United States Code (USC) 3701 *et seq.*, as amended, and is recognized as a tax-exempt organization under Section 501(c)(3) of the Internal Revenue Code. The established purpose of the NFWF is to undertake and conduct other activities that will further the conservation and management of fish, wildlife, and plant resources of the United States for present and future generations of Americans. NFWF is authorized to receive and administer funds for mitigation of impacts to natural resources and other amounts arising from legal, regulatory, or administrative proceedings, subject to the condition that the amounts are received or administered for purposes that further the conservation and management of fish, wildlife, plants, and other natural resources (16 USC 3703(c)(1)(K)).

The Framework defines in-lieu fee mitigation as payment of funds to the BLM or a natural resource management agency, foundation, or other appropriate organization for mitigation projects or activities that address Project impacts. BLM Manual Section MS-1794 and Handbook H-1794-1 define an in-lieu fee fund as “an arrangement where actions to restore, establish, enhance, and/or preserve resources (all of which may lead to accrual of credits) are conducted in a defined geographic area, by pooling and spending monetary funds from a single or multiple public land users, for the purpose of compensating for residual effects to resources from public land uses (which qualify as accrual of debits). In general, a mitigation fund’s responsible party accepts funds for compensatory mitigation from public land users, whose obligation to provide compensatory mitigation is then transferred to the mitigation fund’s responsible party.” (BLM 2021a, 2021b). Therefore, once TransWest provides the compensatory funding, BLM and/or other BLM-approved entities will be responsible for the selection, approval, and implementation oversight of conservation easement acquisitions, restoration and/or rehabilitation projects, and their success in achieving mitigation goals and objectives. As such, the following sections provide recommended guidance for the BLM and other BLM-approved entities that become involved in the mitigation process.

3.2 Fund Management

Evaluation Matrix Cross-Reference Code(s): C3, C4, C7, C8, C9, C10, C11, C12, C13

The Project compensatory mitigation funds (Program Funds) will be placed into a Sub-Account (created within the NMC Account) and managed in accordance with the Agreement. The Fund Administrator will be responsible for holding Program Funds in the Sub-Account in accordance with the Agreement and disbursing funds.

To support this review and approval process, the Fund Administrator will verify and document if and how submitted projects meet standards in H-1794-1, the Framework, the ROD, and this Plan.

NFWF will allow the BLM, and applicable federal and state agencies, an opportunity to review proposed mitigation activities for consistency with the decision documents and will seek the BLM’s support in the prioritization processes for project selection.

3.3 Eligible Compensatory Mitigation Projects

Evaluation Matrix Cross-Reference Code(s): C1, C3

Compensatory mitigation is defined in the BLM ROD as compensation for an impact by replacing or providing substitute resources or environments (40 CFR 1508.20). Means to compensate for remaining unavoidable impacts after all appropriate and practicable avoidance and minimization measures have been applied can be accomplished by replacing or providing substitute resources or

1 environments through the restoration, establishment, enhancement, or preservation of resources and
2 their values, services, and functions.

3 The BLM ROD specifies that selected compensatory mitigation projects be timely in their
4 implementation and provide additional habitat value relative to baseline conditions expected under
5 existing management. Compensatory mitigation projects should be selected based on best available
6 science, are expected to deliver anticipated results, and are reasonably certain to provide measurable
7 benefits to GRSG.

8 TransWest has identified that 80% of Program Funds be allocated for conservation easements
9 (preservation), 10% for restoration projects, and 10% for rehabilitation projects in the form of pinyon-
10 juniper removal. The following goals and priorities from the Northwest Colorado Greater Sage-
11 Grouse Conservation Plan (Northwest Colorado Greater Sage-Grouse Working Group 2008) and the
12 Northwest Colorado GRSG ARMPA should be incorporated into selected projects:

13 • **BLM Northwest Colorado GRSG ARMPA Objectives**

- 14 ○ When planning restoration treatments in GRSG habitat, prioritize seasonal habitat areas
15 that are thought to be limiting GRSG distribution, abundance, and/or seasonal habitat
16 desired conditions as outlined in Table 2-2 of the Northwest Colorado GRSG ARMPA.
- 17 ○ Manage for a habitat objective that is primarily sagebrush with a mosaic of seral stages
18 and sagebrush in all age classes. On a site-by-site basis, do not allow treatments that
19 would adversely affect GRSG populations.
- 20 ○ Remove conifers encroaching into sagebrush habitats, in a manner that considers Tribal
21 cultural values. Prioritize treatments closest to occupied GRSG habitat and near occupied
22 leks, and where juniper encroachment is phase 1 or phase 2.
- 23 ○ Manage wet meadows to maintain diverse species richness, including a component of
24 perennial forbs, relative to site potential (i.e., reference state).

25 • **Improving Habitat Quality**

- 26 ○ Restore understory vegetation in areas lacking desirable quality and quantity of
27 herbaceous vegetation where economically feasible using native seed mixes and agency-
28 recognized methods (e.g., seedings, grazing management, exotic and noxious weed
29 control, etc.)
- 30 ○ Remove encroaching trees and tall shrubs mechanically or by other methods, where
31 needed to maintain visibility at lek sites and security from predation in other seasonal
32 habitats
- 33 ○ Restore or enhance important degraded mesic areas
- 34 ○ Reclaim and/or re-seed after wildfire disturbance

35 • **Habitat Loss and Fragmentation**

- 36 ○ Maintain or reestablish sagebrush patches of sufficient size and appropriate shape to
37 support GRSG between agricultural fields
- 38 ○ Apply GRSG-friendly seed mixes, including bunchgrasses, forbs, and sagebrush, in
39 conservation reserve program and other grassland plantings
- 40 ○ Reseed large areas of introduced plant species that are not meeting GRSG habitat needs
41 with native species where appropriate
- 42 ○ Treat pinyon or juniper trees that are encroaching on good quality sagebrush habitat
- 43 ○ Utilize conservation easements and other land protection vehicles with willing sellers in
44 GRSG habitats

- 1 ○ Reduce the impact of existing fences in key habitats where feasible. Design and install
- 2 new fences to minimize impacts on GRS in key habitats where feasible

3 Examples of anticipated benefits for different project types as evaluated in the FEIS are included in

4 Table 3.

5

1 **TABLE 3 POTENTIAL MITIGATION PROJECTS MODELED IN HEA**

Mitigation Project Type	Brief Project Description	Anticipated Benefits
Fence removal and marking with flight diverters	Fences removed or marked in 1) sections of fence known to cause GRSG collisions; 2) within 3 km (1.2 miles) of leks (Stevens et al. 2013) or other high risk areas; 3) in areas with low slope and terrain ruggedness (Stevens 2011); and 4) where segments are bounded by steel t-posts with spans greater than 4 m (Stevens 2011).	<ul style="list-style-type: none"> • Reduce mortality due to GRSG collisions • Increase visibility of fences, where diverters are used • Increase contiguous patches of shrub-steppe habitat • Remove localized grazing pressure where fences are removed, thereby increasing local habitat quality (e.g., bunchgrass cover)
Sagebrush restoration and improvement projects	Seeding, planting seedlings, or transplanting containerized sagebrush plants (one plant per 5 m ²).	<ul style="list-style-type: none"> • Create contiguous patches of shrub-steppe habitat with optimal sagebrush cover and height • Increase availability of high-quality nesting, brood rearing, and winter habitats
Juniper/conifer removal	Mechanical removal (lop and scatter, cut-pile-cover, or mastication) of juniper/conifer adjacent to areas with optimal sagebrush cover and height.	<ul style="list-style-type: none"> • Reverse juniper/conifer encroachment on shrub-steppe habitat to increase contiguous patches of GRSG habitat • Increase light penetration to support a forb and grass understory
Conservation easements	Removes threat of specific land uses to sensitive wildlife populations.	<ul style="list-style-type: none"> • Prevent GRSG habitat destruction or degradation near urban areas and oil and gas development • Reduce future fragmentation of shrub-steppe habitat
Noxious weed control	Apply herbicides or implement prescribed burns to reduce the spread of noxious weeds in disturbed habitats or areas susceptible to the spread of noxious weeds.	<ul style="list-style-type: none"> • Reduce susceptibility to noxious weed invasions and pest outbreaks
Water developments	Install bubblers on existing and new wells and divert water from existing reservoirs and stock tank pipeline networks for application in upland and lowland habitats.	<ul style="list-style-type: none"> • Increase forb and insect availability for brood rearing • Increase water sources • Increase wetland habitat, riparian habitat, and lowland wet meadow habitat • Divert livestock away from riparian areas and wet meadows

2

3.4 Measuring Success

Evaluation Matrix Cross-Reference Code(s): C8, C9, C10, C11, C12

Per the Framework, TransWest used the HEA to quantify habitat services lost from the Project and then determined the amount of beneficial (credit) DSAYs needed to achieve a not net loss standard for the Project. To achieve a net conservation gain (The BLM defines net conservation gain [or net benefit] as being met when mitigation results in an improvement above baseline conditions [BLM 2021a]) the BLM can implement additional mitigation standards to achieve resource objectives and compensate for the residual effects from public land uses such as the Project (BLM 2021a). Previous HEA results published in the Project's FEIS clearly demonstrate the efficacy of the habitat improvement and mitigation actions summarized in the eligible project types noted above in Table 2. The substitution of one of these other mitigation projects in place of conservation easements may be done at the discretion of the Fund Administrator to achieve the same desired results (i.e., net conservation gain), though substitution of one mitigation type for another will not affect the amount of funding placed in the Sub-Account. Once TransWest deposits the funds calculated in Section 2.5 into the Sub-Account, TransWest will have fulfilled its compensatory mitigation responsibilities under the in-lieu fee arrangement.

The BLM's Assessment, Inventory, and Monitoring (AIM) strategy will be considered for use in monitoring implemented projects. The goal of the AIM strategy is to reach across programs, jurisdictions, stakeholders, and agencies to provide standardized information to help inform management decisions (Toevs et al. 2011). The BLM's AIM strategy operates using standardized field methods that allow for datasets to be collected in different areas and for different objectives at different scales, which aligns well with the amount and type of mitigation projects the Review Team may choose to employ. The AIM strategy includes different core indicators (e.g., vegetation composition, invasive species, vegetation height, and amount of bare ground) that can be used during monitoring efforts and provides the corresponding data collection method type for capturing certain quantitative elements of information. The standardized field methods developed for terrestrial and lotic systems are likely the most applicable for mitigation projects implemented under the Agreement.

Although the ROD includes detailed requirements for monitoring, adaptive management, and reporting, the type, extent, frequency, and duration of those processes will ultimately be determined by the Fund Administrator and stakeholders based on the implemented activity/project type.

4.0 PRINCIPLES AND KEY ATTRIBUTES OF COMPENSATORY MITIGATION

The BLM's mitigation manual and handbook and (BLM 2021b, 2021a), the Project ROD, and the Framework establish principles and key attributes of compensatory mitigation that are to be addressed in this Plan. The mitigation activities need to comply with all relevant laws and policies, which includes compliance with BLM's mitigation manual and handbook (e.g., projects are sited within a landscape-scale approach, projects are durable, in addition to baseline conditions, and will achieve resource objectives in appropriate timeframes). The following sections outline those principles and key attributes and demonstrate how this Colorado Plan addresses the corresponding requirements and criteria.

4.1 Duration

Evaluation Matrix Cross-Reference Code(s): P1

The goal of duration is to achieve targeted biological conditions in a time frame commensurate with and proportional to the biological impacts to be offset. This Colorado Plan requires each project funded be developed with provisions that ensure compensatory mitigation projects achieve and maintain desired outcomes and be resilient to foreseeable changes for the full duration of Project impacts. As required by the Framework, the organization of the HEA is also set up to ensure duration of the modeled credit period equates to the period of Project-related impacts to ensure that habitat service losses are fully offset through habitat service gains over a 102-year period. Lastly, TransWest will provide the in-lieu fee payment before Project impacts occur, helping to prevent time lags in producing conservation benefits.

4.2 Durability

Evaluation Matrix Cross-Reference Code(s): P2

The Framework requires this Colorado Plan include details that demonstrate that resource, administrative, and financial assurances are sufficient and adequately described in relation to compensatory mitigation measures and compensatory mitigation projects. Accordingly, the eligibility requirements for projects funded by the NFWF-administered fund will include provisions that ensure resource, administrative, and financial assurances are accounted for through the site selection and development process.

4.3 Mitigation Measures and Project Outcomes, Performance Standards, Metrics, and Accounting

Evaluation Matrix Cross-Reference Code(s): P3

The Framework requires this Plan to utilize the HEA. A thorough description of the HEA methodologies used to determine debits and credits in this Plan is provided in Attachment C. This principle also requires a suite of compensatory mitigation projects that, based on best available science, are expected to deliver results, are reasonably certain to provide the greatest benefit, and are measurable. Accordingly, TransWest has proposed a project mix of 80% conservation easements, 10% sagebrush habitat restoration, and 10% sage-grouse habitat rehabilitation in the form of pinyon-juniper removal; additional project examples are provided in Section 3.3. Final projects selected for funding will include review by agency biologists and other expert stakeholders to ensure that project goals, outcomes, and performance standards are accounted for through the site selection and project development, implementation, and monitoring process. Lastly, this principle requires an accounting system be used to track credits and debits. The NFWF-administered fund will include accounting, tracking, and reporting of measures, funds, and credits.

4.4 Effectiveness Monitoring

Evaluation Matrix Cross-Reference Code(s): P4

The Framework requires this Colorado Plan identify the type, extent, and duration of effectiveness monitoring for mitigation measures, as guided by the degree of uncertainty associated with a mitigation measure, the amount and type of the mitigation measure, and the potential need for adaptive management. Accordingly, the NFWF-administered fund will include requirements to

develop a monitoring system for each project funded by the Program in accordance with the requirements in the Framework.

4.5 Adaptive Management

Evaluation Matrix Cross-Reference Code(s): P5

The Framework requires this Colorado Plan include a thorough adaptive management plan that identifies provisions to respond to lessons learned in the scientific community based on research, implemented compensatory mitigation measures and projects, and associated effectiveness monitoring. Because mitigation projects to be selected by the Fund Administrator for implementation are unknown at this time, this Colorado Plan requires adaptive management provisions be included for each project funded by the NFWF-administered fund.

4.6 Reporting

Evaluation Matrix Cross-Reference Code(s): P6

The Framework requires this Colorado Plan clearly articulate reporting methods and timeframes for preparation and submission of periodic reports (e.g., quarterly, biannual, annual) to the appropriate BLM offices on the implementation and effectiveness of the compensatory mitigation measures and compensatory mitigation projects. Accordingly, reporting requirements will be identified for each project approved by the NFWF-administered fund as described in Section 3.4.

4.7 Responsible Parties

Evaluation Matrix Cross-Reference Code(s): P7

The Framework requires this Colorado Plan clearly identify the responsible parties who are accountable for fulfilling all aspects of the GRSG mitigation obligations including ensuring the durability and effectiveness of impact avoidance and minimization measures and compensatory mitigation projects, achieving the desired mitigation measures' outcomes, and complying with monitoring, adaptive management, and reporting. TransWest is responsible for avoiding and minimizing impacts to GRSG as detailed in this Colorado Plan (Attachment B) and providing adequate financial assurances to support the HEA-quantified compensatory mitigation. The NFWF Fund Administrator and project Review Team will be responsible for compensatory mitigation project selection and implementation, monitoring, reporting, and adaptive management, and ensuring durability.

4.8 Best Available Science

Evaluation Matrix Cross-Reference Code(s): P8

The Framework requires this Colorado Plan incorporate the best available science and science-based monitoring protocols and methods for identifying compensatory mitigation sites, evaluating compensatory mitigation projects, and assessing habitat-based functions. Accordingly, the HEA was used to evaluate and quantify habitat functionality using the best available science and recommendations provided by the TAG. This Colorado Plan also establishes requirements for establishment of the NFWF-administered fund that will include a formal project selection process to verify whether the principles established in the Framework are being considered, including rigorously

considering best available data and input from local and/or regional professional resource managers and experts.

4.9 Managing Risk and Uncertainty

Evaluation Matrix Cross-Reference Code(s): P9

The Framework requires this Colorado Plan identify the risks and uncertainties that exist when predicting the effectiveness of compensatory mitigation projects. The threats present and widespread in northwest Colorado include agriculture conversion, wildfire, noxious and invasive weeds, energy development, mining, infrastructure, improper grazing, and recreation (BLM Northwest Colorado District Office Colorado State Office 2015). This Colorado Plan establishes provisions be developed to help manage risk and uncertainty and that monitoring and adaptive management programs be developed for each project funded by the Program.

4.10 Reasonable Relationship

Evaluation Matrix Cross-Reference Code(s): KA1

The Framework states that this Colorado Plan provide mitigation options for habitat restoration and enhancement and conservation measures that are reasonably related and proportional to the residual impacts associated with the Project. From a temporal proportionality perspective, the organization of the HEA is set up to ensure duration of the credit period equates to the period of Project-related impacts so that habitat service losses are fully offset through habitat service gains.

4.11 Timeliness

Evaluation Matrix Cross-Reference Code(s): KA2

The Framework requires this Colorado Plan identify and present opportunities to mitigate temporal losses (timing of impacts relative to timing of mitigation) through opportunities for preservation, use of higher mitigation ratios, etc. The in-lieu fee payment will be provided by TransWest before Project-related impacts occur, helping to prevent time lags in providing conservation benefits. Selection and implementation of mitigation projects will be the responsibility of the Fund Administrator as described in Section 3.2. All funds provided by TransWest will be distributed by the Fund Administrator within 5 years of fund establishment.

4.12 Baseline and Additionality

Evaluation Matrix Cross-Reference Code(s): C5, KA3

The Framework requires this Colorado Plan provide sufficient detail on how compensatory mitigation projects will be evaluated to demonstrate a direct improvement to the baseline of GRSG habitat conditions and function. Accordingly, Attachment C has been developed to describe, in detail, how the HEA establishes baseline and quantifies habitat service gains to offset impacts. Additionality from a net gain perspective is also summarized in Section 2.4. The funds contributed under this Colorado Plan will provide benefits to GRSG beyond, or in addition to, those that would be achieved under other applicable regulations and management plans. The monitoring program implemented for each project can be used to further demonstrate improvements in habitat conditions and functions

5.0 CONSISTENCY WITH THE STATE OF COLORADO

As summarized in Section 1.2.2, CDNR-CPW developed a Conservation Plan for the GRS in 2008 designed to increase the abundance and viability of the species and its habitat. Pursuant to feedback from USFWS in 2013, CDNR-CPW completed the Colorado Package (2013) and Synthesis Report (2014) to provide additional information on the implementation and effects of conservation efforts. The Colorado Package and Synthesis Report, however, are geared toward oil and gas activities, exurban development, and grazing and, therefore, are not applicable to this Colorado Plan.

In 2015, EO 2015-004 was issued requiring all state agencies whose operations affect GRS or its habitat to coordinate with CDNR-CPW to avoid, minimize, and/or mitigate adverse impacts to the species as articulated in the Colorado Conservation Plan. The Colorado Conservation Plan provides the primary issues for GRS with respect to new infrastructure (e.g., power lines), as well as the recommended strategies for addressing those identified issues. Appendix B to the Colorado Conservation Plan specifically outlines disturbance guidelines for GRS that indicate how to avoid or minimize impacts using the current best available science.

While TransWest recognizes the measures and guidance incorporated into the Colorado Conservation Plan, the Framework establishes a suite of agency-required mitigation measures for this Colorado Plan that must be implemented to avoid, minimize, rectify, and/or restore Project effects as analyzed in the Project FEIS (see Attachment B). TransWest also recognizes the State of Colorado's market-driven habitat exchange program created to mitigate for residual impacts of development to GRS habitat as referenced in EO 2015-004. However, the Framework requires TransWest to calculate compensatory mitigation using the HEA as described in this Colorado Plan. Therefore, only certain elements of State of Colorado guidance that 1) do not conflict with the Project ROD and 2) offer applicable guidance for GRS mitigation in addition to the measures established in the Framework (Attachment B) are used in this Colorado Plan. Ultimately, this Colorado Plan accomplishes the same objectives established in EO 2015-004 and the Colorado Conservation Plan by avoiding and minimizing impacts to GRS and compensating for remaining impacts to achieve net conservation gain.

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Attachment A

Oversight Committee Representation

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AGENCY REPRESENTATION

Bureau of Land Management

- Desa Ausmus
- Lisa Belmonte
- Chris Domschke
- Christine Fletcher
- Delissa Minnick
- Hunter Seim
- Leah Waldner

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- Kelly Cummins

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Attachment B

Mitigation Hierarchy for Greater Sage-Grouse

TABLE B-1 MITIGATION STRATEGY FOR GREATER SAGE-GROUSE THROUGH MITIGATION MEASURES

Impact Indicator ¹	Initial Impacts (Agency Preferred Alternative) ²	Strategy to Avoid, Minimize, and Rectify Impacts on the Resource			Residual Effects (Agency Preferred Alternative) ³	Warrant Compensatory Mitigation?	Mitigation Strategy Compensatory Mitigation
		Avoidance ⁴	Minimize ⁵	Rectify/Restore ⁵			
Wildlife and Special Species Mitigation Measures							
Long-term and temporary habitat degradation, fragmentation, and loss	Impacts to sage grouse habitat due to construction and operation of project: o Colorado - 28.0 miles of priority habitat - 54.5 miles of general habitat - 25.2 miles of priority habitat within 4 miles of leks	WLF-1: No vegetation clearing or trimming, blasting, or other new surface disturbing activities would occur during the avian breeding season.	SSWS-5 General Measure 2: To minimize fragmentation of suitable sage-grouse breeding, brood-rearing, and wintering habitats, the approved transmission line ROW will use existing roads, create no new permanent roads, be accessed via drive and crush wherever possible, and be micro-sited in coordination with applicable state and federal wildlife management agencies. SSWS-5 General Measure 6: Under Applicant Committed Design Feature TWE-26, TransWest has committed to developing a Noxious Weed Management Plan in accordance with existing BLM Pesticide Use Plan requirements. Control of noxious weeds will minimize the potential for weed-related degradation of occupied sage-grouse habitat. Prior to the use of chemical weed control agents, herbicide applications will be reviewed by agency wildlife biologists to ensure consistency with state and local greater sage-grouse conservation goals.		Moderate residual effects: Moderate residual impacts to sage grouse habitat, including sage grouse Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH) in Colorado. Disturbance to the slow-growing vegetation communities in these habitats could take decades to recover to pre-disturbance conditions. Temporary and permanent habitat loss would be minimized through avoiding sensitive areas (WLF-1) minimizing new roads (SSWS-5 General Measure 2) and developing a Noxious Weed Management Plan (SSWS5, TWE-26, and NX-1), maintaining existing contours (TWE-11 to TWE13), and implementing reclamation (VG-1,VG-3, and VG-5) However, permanent habitat loss would occur in areas occupied by transmission structures, new access roads, and other Project features for the life of the project. Impacts to sage grouse habitat would disturbance would be minimized through avoidance of sensitive species habitat where possible, implementation of conservation measures impacting sage grouse habitat.	Yes. The nature and extent of residual effects associated with disturbance from Project activities during construction that were identified through the NEPA process warrant compensatory mitigation to mitigate for long-term and temporary habitat loss. Without compensatory mitigation, the residual effects would inhibit achieving BLM Colorado approved resource management plan amendment (ARMPA) objectives, and, therefore, warrant compensatory mitigation.	Standard: Net conservation gain. Objective 1: To compensate for long-term and temporary habitat loss. Measure(s): To be determined in the Greater Sage-Grouse Compensatory Mitigation Plan using the Habitat Equivalency Analysis Tool.
Mortality due to electrocution, in-flight collisions with transmission line infrastructure, and collisions with construction and maintenance vehicles	Impacts to sage grouse populations due to direct mortality from bird strikes and electrocution		WLF-5: In Audubon Important Bird Areas crossed by the 250-foot-wide transmission line Right of Way, TransWest would follow the recommendations in Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, would be employed at the discretion of the appropriate BLM Field Office Manager in Audubon Important Bird Areas crossed by the 250-foot-wide transmission line Right of Way. WLF-7: In Bird Habitat Conservation Areas crossed by the 250-foot-wide transmission line Right of Way, TransWest would follow the recommendations in Reducing Avian Collisions with	WLF-10: To avoid or minimize long term disturbance to wildlife associated with public use of the ROW and new access roads during Project operation, these roads would be closed or rehabilitated using methods and monitoring developed through consultation with the landowner or land management agency. Depending on facility and ROW maintenance needs, methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour and vegetation.	Low residual effects. Mortality from electrocution and collisions with transmission line infrastructure is possible but unlikely due to the use of avian-safe design standards (WLF-5, WLF-7, and WLF-8) and flight diverters (SSWS-5 Site Specific Measures 3 and 4). Mortality from vehicle collisions is possible but unlikely due to restrictions on the spatial extent of construction activities (TWE-9 , enforcement of a speed limit (SSWS-5 General Measure 5)) and avoidance of Project activities during sensitive periods (SSWS5 General Measure 4).	No. The nature and extent of residual effects identified through the NEPA process indicate that mortality due to electrocution, in-flight collisions with transmission line infrastructure, and collisions with construction and maintenance vehicles is possible but unlikely and, therefore, do not warrant compensatory mitigation. Also, residual effects would not inhibit achieving Colorado ARMPA objectives or compliance with laws, regulations, and/or policies. Finally, residual effects related to this resource indicator have not been previously identified in a mitigation strategy as warranting compensatory mitigation	

Impact Indicator ¹	Initial Impacts (Agency Preferred Alternative) ²	Strategy to Avoid, Minimize, and Rectify Impacts on the Resource			Residual Effects (Agency Preferred Alternative) ³	Warrant Compensatory Mitigation?	Mitigation Strategy Compensatory Mitigation
		Avoidance ⁴	Minimize ⁵	Rectify/Restore ⁵			
			<p>Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, would be employed at the discretion of the appropriate BLM Field Office Manager in Bird Habitat Conservation Areas crossed by the 250-foot-wide transmission line Right of Way.</p> <p>WLF-8: To minimize collision potential for avian species, TransWest would design the TWE Project to meet the standards described in the Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012).</p> <p>SSWS-5 Site-Specific Measure 3: In areas determined to be unsuitable for the installation of self-supporting tubular steel monopoles, TransWest may be required to install agency-approved guy wire marking devices on all transmission tower guy lines to increase the visibility of each wire and reduce the risk of collision by flying greater sage-grouse.</p> <p>SSWS-5 Site-Specific Measure 4: Outfit all newly constructed fencing with agency–approved bird diverters/wire markers</p>				
Disturbance during sensitive periods (including during breeding activities at lek locations) resulting from human presence, vehicle use, and noise during construction and maintenance	See long-term and temporary habitat loss		<p>WLF-4/VR-8: Minimize lighting at terminals, substations, series compensation stations, and construction facilities by installing dark-sky lighting to the extent permitted by OSHA and down-shield lights to reduce night-glare and light pollution.</p> <p>SSWS-5 General Measure 1: Placement of Project structures and access roads will maximize use of topographic features to visually screen Project facilities from high quality greater sage-grouse habitat.</p> <p>SSWS-5 General Measure 4: To limit disturbance to lekking and nesting activity, disruptive construction and maintenance activities within 4 miles of occupied/active leks will be prohibited between March 1 and June 30.</p> <p>SSWS-5 General Measure 5: To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will implement a vehicle speed limit of 15 mph on roads without posted</p>	<p>WLF-10: To avoid or minimize long term disturbance to wildlife associated with public use of the ROW and new access roads during Project operation, these roads would be closed or rehabilitated using methods and monitoring developed through consultation with the landowner or land management agency. Depending on facility and ROW maintenance needs, methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour and vegetation.</p>	<p>Low residual effects:</p> <p>Behavioral modification could occur from disturbance from Project activities, but would be minimized through limiting disturbance during sensitive periods as specified in the Colorado ARMPA.</p> <p>Interruption and/or alteration of seasonal migrations and movements among populations could occur, but is unlikely due to avoiding disturbance during sensitive periods as specified in the Colorado ARMPA.</p> <p>Disruption of nesting and breeding activities and avoidance of habitat due to vehicle noise and human presence resulting from public use of new access roads access roads could occur, but would be minimized by providing shielded lighting, screening project facilities, limiting access during sensitive time periods limited public accessibility and controlling vehicle speeds (WLF-4, VR8,</p>	<p>No. The nature and extent of residual effects identified through the NEPA process indicate that behavioral modification could occur as a result of disturbance from Project activities, but would be minimized through avoiding disturbance during sensitive periods and limiting public accessibility of new or improved access roads. Therefore, compensatory mitigation is not warranted. Also, residual effects would not inhibit achieving Colorado ARMPA objectives or compliance with laws, regulations, and/or policies. Finally, residual effects related to this resource indicator (behavioral modifications affecting use of habitat) have not been previously identified in a mitigation strategy as warranting co</p>	
Interruption and/or alteration of seasonal migrations and movements among populations							
Disruption of nesting and breeding activities and avoidance of habitat due to vehicle noise and human presence from public use of new access roads							

Impact Indicator ¹	Initial Impacts (Agency Preferred Alternative) ²	Strategy to Avoid, Minimize, and Rectify Impacts on the Resource			Residual Effects (Agency Preferred Alternative) ³	Warrant Compensatory Mitigation?	Mitigation Strategy Compensatory Mitigation
		Avoidance ⁴	Minimize ⁵	Rectify/Restore ⁵			
			speed limits in area of occupied sage grouse habitat.		SSWS-5 General Measures 1, 4, and 5).		
Increased avian presence and predation due to increased perching and nesting opportunities on transmission structures (indirect effects) Avoidance behavior due presence of tall structures, presence of new roads, and increase in avian and mammalian predation pressure (indirect effects)	See long-term and temporary habitat loss	None	SSWS-5 General Measure 3: To limit corvid predation on greater sage-grouse, TransWest will develop a Raven Management Plan that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW and includes post-construction monitoring for ravens and removal of raven nests. SSWS-5 Site-Specific Measure 1: Installation of alternative structure types consisting of self-supporting tubular steel monopole structures to reduce the potential for perching and nest construction by avian predators of greater sage grouse. SSWS-5 Site-Specific Measure 2: Installation of perch deterrents on transmission structures to reduce the potential for perching by avian predators of greater sage-grouse.	None	Moderate residual effects. Use of alternative structure types (SSWS-5 Site Specific Measure 1), the use of perch deterrents (SSWS-5 Site Specific Mitigation 2) and development of a Raven Management Plan (SSWS 5 General Measure 3) may reduce, but will not completely eliminate perching by raptors and other avian predators. The presence of tall structures, new roads, and increases in predation in Greater Sage Grouse habitat that indirectly results in avoidance of habitat or other alternations in behavioral patterns in habitat used by Greater Sage-Grouse. Reclamation of temporary work areas will accelerate the return of hiding cover that will reduce increased opportunities for increased avian and mammalian predation, but this will take years.	Yes. The nature and extent of residual effects associated with the presence of the transmission line structures in Greater Sage-Grouse Habitat that were identified through the NEPA process warrant compensatory mitigation to mitigate for the resulting increased avian presence from introduced perching and nesting opportunities. Without compensatory mitigation, the residual effects would inhibit achieving Colorado ARMPA objectives. Yes. The nature and extent of residual effects associated with habitat fragmentation from Project activities that were identified through the NEPA process warrant compensatory mitigation. Without compensatory mitigation, the residual effects would inhibit achieving Colorado ARMPA objectives, and, therefore, warrant compensatory mitigation.	Standard: Net conservation gain. Objective 1: To reduce avian presence from perching opportunities in Greater Sage-Grouse habitat. Measure(s): To be determined in the Greater Sage-Grouse Compensatory Mitigation Plan using the Habitat Quantification Tool.
Soils Mitigation Measures							
Alterations to soil structure, chemistry, nutrients, hydrology, and species composition Temporary and permanent loss of vegetation communities used by sage-grouse	Impacts to sage-grouse habitat due to changes in vegetation composition or decreased vegetation cover or quality due to soil erosion or sedimentation	S-2: Construction, excavation, or re-spreading with frozen or saturated soils would be prohibited. S-5: Surface activities would be prohibited when soils or road surfaces become saturated to a depth of 3 inches or less if mixing of the topsoil and subsoil would occur or the soil surface becomes unsafe for vehicular travel. S-9: Excess subsoil that is excavated for foundations would not be spread on the soil surface (on top of topsoil) or on access roads. Excess subsoil would be disposed of in accordance with federal, state, and local requirements.	S-5: Surface activities would be prohibited when soils or road surfaces become saturated to a depth of 3 inches or less if mixing of the topsoil and subsoil would occur or the soil surface becomes unsafe for vehicular travel. S-6: During construction, erosion control measures would be inspected after every storm event and maintained. S-7: Lands managed by federal agencies would be subject to any restrictions related to construction on steep slopes or sensitive soils under the applicable federal land use plans. For lands not subject to such restrictions, permanent access roads would not be constructed on slopes over 25 percent unless TransWest provides an engineering design and associated Best Management Practices to ensure slope stability and erosion control to be reviewed and approved by the appropriate land management agency or land owner. S-11: Permanent erosion control measures would be installed on all project access roads used for	S-1: Where permanent facilities or structures would be located, the entire topsoil horizon would be salvaged for use in reclamation, prior to surface disturbance. Topsoil would be spread evenly around the permanent structure (not left in piles) and revegetated for future use. S-3: During reclamation of temporary work areas and temporary construction access roads, compacted areas (typically any area that receives repeated traffic or 3 or more passes by heavy equipment) would be decompacted, to the depth of compaction, as necessary by subsoiling, paraplowing, or parabolic ripping on the contour to the depth of compaction. This would help prepare the seed bed, encourage infiltration and help to prevent accelerated runoff and erosion. Scarification would only be used on shallow soils. The need for decompaction and the compaction depth would be determined on a case by case basis, by a qualified environmental inspector or soil scientist. S-4: During decommissioning, where a soil sterilizer has been applied, sterile soils would be removed prior to the replacement of topsoil and seeding. S-8: Newly constructed access roads would be gated to restrict motorized use	Moderate residual effects: Moderate residual impacts to sage grouse habitat, including sage grouse Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH) in Colorado. Disturbance to the slow-growing vegetation communities in these habitats could take decades to recover to pre-disturbance conditions. Temporary and permanent habitat loss would be minimized through avoiding sensitive areas (S-2, S-5 and S-9) , minimizing vegetation clearing minimizing the spatial extent of construction activities (TWE-11 to TWE-13 and S-5, S-6, S-7, and S-11)), maintaining existing contours, and implementing effective reclamation (VG-1, VG-3, S-1, S-3, S-4, S-8, and S-13). However, permanent habitat loss would occur in areas occupied by transmission structures, new access roads, and other Project features for the life of the project. Impacts to sage grouse habitat from disturbance would be minimized through avoidance of sensitive species habitat where	Yes. The nature and extent of residual effects associated with disturbance from Project activities during construction that were identified through the NEPA process warrant compensatory mitigation to mitigate for long-term and temporary habitat loss. Without compensatory mitigation, the residual effects would inhibit achieving BLM Colorado approved resource management plan amendment (ARMPA) objectives, and, therefore, warrant compensatory mitigation.	Standard: Net conservation gain. Objective 1: To compensate for long-term and temporary habitat loss. Measure(s): To be determined in the Greater Sage-Grouse Compensatory Mitigation Plan using the Habitat Equivalency Analysis Tool.

Impact Indicator ¹	Initial Impacts (Agency Preferred Alternative) ²	Strategy to Avoid, Minimize, and Rectify Impacts on the Resource			Residual Effects (Agency Preferred Alternative) ³	Warrant Compensatory Mitigation?	Mitigation Strategy Compensatory Mitigation
		Avoidance ⁴	Minimize ⁵	Rectify/Restore ⁵			
			operations and maintenance. Erosion control measures would be inspected and maintained at least annually or as required by the applicable state Stormwater Pollution Prevention Plan.	by the public at the land management agency or landowner's discretion. In some instances, other methods may need to be employed to prevent public access. After construction is complete, permanent access roads would remain gated at the land management agency or landowner's discretion. If the road is no longer needed for operations, it would be reclaimed with the following procedures or in accordance with the land-managing agencies direction: 1. Remove all stream crossings and restore stream banks to natural contours; 2. Reestablish natural drainage patterns; 3. Decompect the road surface by subsoiling along the entire disturbed length; 4. Recontour the road prism to the original land contours; 5. Seed with an agency or landowner approved seed mixture; and 6. Gates and closure signage should be left in place until adequate regeneration/ rehabilitation occurs. S-13: Follow-up seeding using native seed or corrective erosion control measures would be required on areas of surface disturbance that experience reclamation failure.	possible, implementation of conservation measures impacting sage grouse habitat (TWE-29 – TWE-34).		
Noxious Weed Mitigation Measures							
Increased weed invasion resulting in permanent alterations in plant community structure, diversity, and function.	Impacts to sage grouse habitat quality due to invasion of non-native invasive and/or noxious weeds.		NX-1: The Noxious Weed Management Plan to be developed as part of the TWE Project Plan of Development would include the following: Pre-construction surveys for noxious weeds in the footprints of the Right of Way, access roads, and ancillary facilities; Pre-construction weed control; Education of construction and operation personnel in each TWE Project region; Washing of vehicles and equipment before entering and leaving the Right of Way; Herbicide spraying; and Annual monitoring and reporting. Survey information collected during pre-construction surveys would include species name, GPS location of weed infestations, percent cover, and approximate size of weed infestations. Control of noxious and invasive species could include chemical, physical, and biological methods and would be developed in consultation with the land agencies and private landowners. The plan would identify species of concern for each BLM Field Office and USFS forest and would focus monitoring and	Moderate residual effects. Increased risk of weed invasion could occur in cleared by the project but would be decreased through minimizing the spatial extent of construction activities and access roads, minimizing vegetation removal, reclaiming disturbed areas, and implementation of the Noxious Weed Management Plan (NX-1 and NX-2) and Pesticide Use Proposal (NX-3).While low residual effects are anticipated the increased risk of noxious weed invasion remains due to Project-related ground disturbance.	Yes. The nature and extent of residual effects associated with disturbance and the resulting risk of weed invasion that were identified through the NEPA process warrant compensatory mitigation to mitigate for long-term and temporary habitat loss. Without compensatory mitigation, the residual effects would inhibit achieving BLM Colorado approved resource management plan amendment (ARMPA) objectives, and therefore warrant compensatory mitigation.	Standard: Net conservation gain. Objective 1: To compensate for long-term and temporary habitat loss. Measure(s): To be determined in the Greater Sage-Grouse Compensatory Mitigation Plan using the Habitat Equivalency Analysis Tool.	

Impact Indicator ¹	Initial Impacts (Agency Preferred Alternative) ²	Strategy to Avoid, Minimize, and Rectify Impacts on the Resource			Residual Effects (Agency Preferred Alternative) ³	Warrant Compensatory Mitigation?	Mitigation Strategy Compensatory Mitigation
		Avoidance ⁴	Minimize ⁵	Rectify/Restore ⁵			
				would be monitored annually by TransWest to ensure successful reclamation is occurring. The length of time for the annual monitoring and the definition of successful reclamation would be determined by the appropriate land management agency. Subsequent actions in areas without successful reclamation would be determined in consultation with the appropriate land management agency. VG-3: A reclamation plan would be developed as part of the Plan of Development. The reclamation plan would define reclamation success for each vegetation type and management agency, list reclamation seed mixes, and detail reclamation monitoring for both interim and final reclamation. Interim and final reclamation success would be monitored annually, or at intervals as required in the reclamation plan, for at least 3 years, or until reclamation success as defined by the reclamation plan is achieved. Reporting of construction, reclamation progress, and monitoring results would be submitted to each land management agency per each office's reporting requirements.	TWE-13), maintaining existing contours, and implementing reclamation (VG-1, VG-3, and VG-5) However, permanent habitat loss would occur in areas occupied by transmission structures, new access roads, and other Project features for the life of the project. Impacts to sage grouse habitat from disturbance would be minimized through avoidance of sensitive species habitat where possible, implementation of conservation measures impacting sage grouse habitat.		
Wildland Fire Mitigation Measures							
Increased risk of fire starts.	Impacts to sage grouse habitat due to changes due to increased fire starts and/or frequency and difficulty in suppressing or otherwise managing fire starts.	FR-6: Where appropriate and feasible, micro-siting of the route would occur in	FR-1: The fire protection plan to be developed as part of the TWE Project Plan of Development, in addition to the items outlined in TWE-64, would include the following: TransWest would implement line patrols to inspect the Right of Way for hazard trees, damage to any component of the TWE Project, and other potentially unsafe conditions that could increase wildland fire ignition risk. TransWest would develop a wildland fire traffic control plan which would stipulate mechanisms through which narrow roads shall be kept passable for emergency service providers in a wildland fire emergency situation; designate the point of contact to administer the wildland fire traffic control plan and facilitate emergency service providers access; identify vehicle parking for construction and maintenance vehicles during wildland fire emergencies; and identify alternative routes for large equipment and vehicle evacuation during wildland fire emergencies. TransWest would outline communication methods to ensure that immediate reporting of during construction activities and maintenance activities is feasible.		Low residual effects hanges in wildfire frequency from increased invasive annual grasses could occur. Additionally, construction activities and operation of the transmission line could increase risk of fire starts. Conversely, clearing of coniferous and deciduous vegetation also would decrease fuel loading, and therefore fire risk, in and around the transmission line. This benefit would be maximized by coordinating with the agency in determining approved vegetation clearing methods. Overall, potential increases in fire frequency would be minimized through minimizing the spatial extent of construction activities and access roads (TWE-7 to TWE-13, TWE-19, TWE-27, and TWE-28, and FR-6), line patrols to remove hazard trees and repair potentially unsafe conditions, minimizing vegetation removal and implementation of the Noxious Weed Management Plan. creased risks of starts would be minimized through adapting construction as necessary in response to high fire risk, including eliminating overland travel, using spotters for welders, not burning trash, etc.	No. Residual impacts related to increased fire risk and frequency identified through the NEPA process would be minor and therefore, do not warrant compensatory mitigation. Also, residual effects related to impacts on fire would not inhibit achieving land-use plan objectives or compliance with laws, regulations, and/or policies. Also, residual effects would not inhibit achieving Colorado ARMPA objectives or compliance with laws, regulations, and/or policies. Finally, residual effects related to this resource indicator have not been previously identified in a mitigation strategy as warranting compensatory mitigation.	

Impact Indicator ¹	Initial Impacts (Agency Preferred Alternative) ²	Strategy to Avoid, Minimize, and Rectify Impacts on the Resource			Residual Effects (Agency Preferred Alternative) ³	Warrant Compensatory Mitigation?	Mitigation Strategy Compensatory Mitigation
		Avoidance ⁴	Minimize ⁵	Rectify/Restore ⁵			
			Each crew member would carry a laminated card listing pertinent telephone numbers for reporting fires and defining immediate steps to take if a fire starts. The cards would be updated as needed, and redistributed to crew members. In consultation with land management agencies, TransWest would identify when and where construction and maintenance work would cease in response to Red Flag Warning events as issued daily by the National Weather Service. Overland drive-and-crush travel would be prohibited or limited (at land management agencies' discretion) during times of high fire risk. TransWest would develop its fire protection plan in consultation with the appropriate land management agencies. FR-2: No open trash burning would occur, unless specifically permitted by the appropriate authorities. FR-3: Activities that could generate a spark such as refueling, smoking, blasting, and welding would only occur on areas that have been cleared. A spotter would be used for welding and other similar activities. The spotter would be equipped with water and tools to quickly extinguish any sparks. FR-4: All engines used in the Right of Way would have an approved spark arrestor. FR-5: TransWest would consult with the land management agencies to ensure vegetation management activities are in line with land management agencies fire management objectives.		Impacts to fire management would be minimized through development of a wildland fire traffic control plan to allow for fire management and communication methods to immediately report fires (FR-1–FR-5).		

Source: Contents of this table and table notes are verbatim from BLM (2016).

1 Impact indicators represent the potential impacts on the resources identified the Final EIS (BLM and WAPA 2015:Chapter 3).

2 Predicted effects of strategies to avoid, minimize, or rectify impacts are not implemented.

3 When the strategies (including Applicant-committed measures, Project design features for environmental protection, and agency-required mitigation measures in response to identified impacts) described in the columns to the left are applied, they are assumed to be effective at avoiding, minimizing, and rectifying/restoring the identified impact. It is assumed that the mitigation strategy will be effective and applied to the entire resource indicators.

4 “Avoidance” refers to measures that avoid the impact altogether by not taking a certain action or parts of an action (40 CFR 1508.20).

5 “Minimize” refers to measures that limit the degree or magnitude of the action and its implementation (40 CFR 1508.20).

6 “Rectify/Restore” refers to measures that would repair, rehabilitate, or restore the affected environment over time (40 CFR 1508.20) (e.g., reclamation practices that would reduce or eliminate impacts during and after the life of the Project).

TABLE B-2 SEASONAL AND SPATIAL RESTRICTIONS FOR GREATER SAGE-GROUSE IN COLORADO

Restriction Language	Jurisdictional Applicability	Implementation
SSWS-5. To avoid or minimize Project-related impacts to greater sage-grouse and its habitat, the BLM and Western have coordinated with applicable federal and state land and wildlife management agencies and other stakeholders to develop a suite of measures for this species. In addition, TransWest has developed a HEA to quantitatively determine an appropriate level of compensatory mitigation that would be implemented to offset unavoidable impacts to sage-grouse habitat. Applicant-committed measures proposed as part of the HEA process are further discussed in FEIS Section 3.8.6.3. The BLM and Western support the implementation of the applicant’s HEA process and compensatory mitigation measures in conjunction with the following impact avoidance and minimization measures developed through the NEPA process (see SSWS-5 requirements below). To reduce impacts to greater sage-grouse from construction and operation of the proposed Project, TransWest, in consultation with the BLM, Western, and applicable federal and state land and wildlife management agencies, would be required to implement the following general design features.	All Lands	See below.
SSWS-5.1. Placement of Project structures and access roads would maximize use of topographic features to visually screen Project facilities from high quality greater sage-grouse habitat (i.e., Colorado – within preliminary priority habitat).	All Lands	Siting and selection of the alignment was addressed through the NEPA process.
<i>[Measure already accounted for in Table 1, but included here as well for consistency with the ROD]</i>		
SSWS-5.2. To minimize fragmentation of suitable sage-grouse breeding, brood-rearing, and wintering habitats, the approved transmission line ROW will use existing roads, create no new permanent roads, be accessed via drive and crush wherever possible, and, be micro-sited in coordination with applicable state and federal wildlife management.	All Lands	The Project has been sited to avoid suitable GRSG habitat wherever possible. Refer to Appendix AA for mapped GRSG restrictions.
<i>[Measure already accounted for in Table 1, but included here as well for consistency with the ROD]</i>		
SSWS-5.3. To limit corvid predation on greater sage-grouse, TransWest will develop a Raven Management Plan that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW and includes post-construction monitoring for ravens and removal of raven nests.	All Lands	The POD includes a Raven Nest Monitoring and Management Plan (Attachment A to Appendix X, Wildlife and Plant Conservation Measures Plan) that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW and includes post-construction monitoring for ravens and removal of raven nests.
<i>[Measure already accounted for in Table 1, but included here as well for consistency with the ROD]</i>		
SSWS-5.4. To limit disturbance to lekking and nesting activity, disruptive construction and maintenance activities within 4 miles of occupied/active leks will be prohibited between March 1 and June 30. Activities determined to be non-disruptive by the BLM, Western, and applicable federal and state land and wildlife management agencies will be permitted between March 1 and June 30.	All Lands	The measure has been incorporated into the final design. Please refer to Appendix AA.
<i>[Measure already accounted for in Table 1, but included here as well for consistency with the ROD]</i>		
SSWS-5.5. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will implement a vehicle speed limit of 15 mph on roads without posted speed limits in areas of occupied sage-grouse habitat.	All Lands	The measure has been incorporated into the final design. Please refer to Appendix AA.
<i>[Measure already accounted for in Table 1, but included here as well for consistency with the ROD]</i>		
SSWS-5.6. Under Applicant Committed Design Feature TWE-26, TransWest has committed to developing a Noxious Weed Management Plan in accordance with existing BLM Pesticide Use Plan requirements. Control of noxious weeds would minimize the potential for weed-related degradation of occupied sage-grouse habitat. Prior to the use of chemical weed control agents, herbicide applications would be reviewed by agency wildlife biologists to ensure consistency with state and local greater sage-grouse conservation goals.	All Lands	A Noxious Weed Management Plan is provided in the POD – Appendix N.
<i>[Measure already accounted for in Table 1, but included here as well for consistency with the ROD]</i>		
SSWS-5.7. Site-specific Measures: In addition to requiring implementation of the general mitigation measures discussed in SSWS-5, the BLM and Western would consider requiring additional impact avoidance and minimization measures on a site-specific basis in areas of greater sage-grouse habitat located within areas that meet all of the following state-specific criteria: - Areas within 4 miles of active leks and within areas of PPH in Colorado; and, Identification of additional greater sage-grouse mitigation measures to be implemented in local areas would be completed prior to finalization of the POD in coordination with the Applicant, BLM, Western, and local interdisciplinary teams comprised of applicable federal and state land and wildlife management agency staff. Criteria for determining site-specific measures could include, but would not be limited to: existing vegetation communities, existing fragmentation, proximity to active leks, visibility of the proposed transmission line and towers from active lek locations, presence of noxious and invasive weed species, topography, proximity to USFWS PACs, proximity to designated winter concentration areas, proximity to nesting habitat, proximity to brood rearing habitat, proximity to available water sources, proximity to other anthropogenic sources of disturbance, and co-location with existing transmission infrastructure.	Federal Lands	Requirements identified by BLM and Western have been established in the ROD and are addressed in this Plan where applicable.
SSWS-5.8. Additional measures identified by the BLM and Western for consideration on a site-specific basis in coordination with appropriate federal and state agencies will include: 1. Installation of alternative structure types consisting of self-supporting tubular steel monopole structures to reduce the potential for perching and nest construction by avian predators of greater sage-grouse. 2. Installation of perch deterrents on transmission structures to reduce the potential for perching by avian predators of greater sage-grouse. 3. In areas determined to be unsuitable for the installation of self-supporting tubular steel monopoles, TransWest may be required to install agency-approved guy wire marking devices on all transmission tower guy lines to increase the visibility of each wire and reduce the risk of collision by flying greater sage-grouse. 4. Outfit all newly constructed fencing with agency-approved bird diverters/wire markers.	Federal lands in Colorado as described in Project ROD	The measure has been incorporated into the final design. Please refer to Appendix AA.
ROD-F-01. Tubular self-supporting structures are required for an estimated 11 miles within a greater sage-grouse Priority Habitat Management Area (PHMA) in Colorado where there are no existing above-ground large transmission structures (Figure ROD F-1). Within the 11 miles of greater sage-grouse PHMA in Colorado, special engineering considerations may guide structure needs at the Yampa River crossing.	BLM	This measure has been incorporated into the final design (Figure 1).

Restriction Language	Jurisdictional Applicability	Implementation
ROD-F-05. A nest management and monitoring plan to reduce avian predation that includes an acceptable application of perch discouragers, nest deterrents, guy wire markings and effectiveness monitoring, and is approved by BLM and cooperating agencies with regulatory authority, is required for construction in greater sage-grouse PHMA and General Habitat Management Area (GHMA) habitat on BLM land in Wyoming, Colorado, and Utah (Figures ROD F-1 through ROD F-3).	BLM	Requirements for installation of monopole structures on federal lands in PHMA are contained in the ROD. These requirements achieve the desired outcome to prevent perching and nesting on transmission structures. Guy wire markers will be installed on all guyed structures on BLM-administred lands located in PHMA or GHMA. The POD includes a Raven Nest Monitoring and Management Plan (Attachment A to Appendix X, Wildlife and Plant Conservation Measures Plan) that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW.
ID-BLM-52. Greater sage-grouse: To reduce potential impacts on greater sage-grouse lek integrity, NSO will be applied within a 0.6 mile radius of a lek site. The NSO area may be altered depending upon the active status of the lek, habitat characteristics, or the geographical relationship of topographical barriers and vegetation screening to the lek site.	BLM (Little Snake Field Office)	The measure has been incorporated into the final design. Please refer to Appendix AA.
ID-BLM-67. Greater sage-grouse: This area encompasses sage grouse leks. Surface Occupancy is not allowed within 1/4 mile of identified lek sites.	BLM (White River Field Office)	The measure has been incorporated into the final design. Please refer to Appendix AA.
ID-BLM-80. Greater sage-grouse: Conversion or adverse modification of the following sage grouse habitats will be avoided: 1) sagebrush stands with ≤50 percent canopy and ≤30" in height, and ≤2 miles from a lek; 2) sagebrush stands with ≤30 percent canopy and ≤30" in height; >2 miles from a lek on occupied summer ranges; 3) any sagebrush stand on slopes ≤0 20 percent in defined winter concentration areas; and 4) sagebrush stands on slopes ≤20 percent showing evidence of winter use.	BLM (White River Field Office)	This measure is addressed through implementation of SSWS-5.4, which provides more spatial coverage during lekking and nesting periods, and also through implementation of ID-BLM-248 regarding winter use areas. Impacts that remain within GRSG habitats (PHMA and GHMA) are addressed through compensatory mitigation.
ID-BLM-230. Greater sage-grouse: To prevent disturbing up to 75 percent of nesting birds, between March 1 and June 30, greater sage-grouse nesting and early brood-rearing habitat (Map 5) will be stipulated as CSU for oil and gas operations and avoidance areas for other surface disturbing activities within a 4 mile radius of the perimeter of a lek. All surface disturbing activities will avoid only nesting and early brood-rearing habitat within the 4 mile radius of the lek during this time period. Exceptions, modification, or waivers will be granted according to criteria established in Appendix B. The actual area to be avoided will be determined on a case-by-case basis, depending on applicable scientific research and site-specific analysis and in coordination with commodity users and other appropriate entities.	BLM (Little Snake Field Office)	The measure has been incorporated into the final design. Please refer to Appendix AA.
ID-BLM-231. Greater sage-grouse: Crucial winter habitat will be closed from December 16 to March 15. In addition, exceptions would be granted according to criteria established in Appendix B.	BLM (Little Snake Field Office)	The measure has been incorporated into the final design. Please refer to Appendix AA.
ID-BLM-247. Greater sage-grouse: If direct and indirect impacts to suitable nesting cover exceeds 10 percent of the habitat available within 2 miles of identified leks, further development will not be allowed from April 15 through July 7. (Development can occur until 10 percent of the habitat associated with a lek is impacted, from then on, additional activity can occur from July 8 through April 14).	BLM (White River Field Office)	This measure is addressed through implementation of SSWS-5.4 and compensatory mitigation that is scaled and designed to offset unavoidable impacts.
ID-BLM-248. Greater sage-grouse: This area encompasses sagebrush habitats that are occupied by wintering concentrations of grouse, or represent the only habitats that remain available for use during periods of heavy snowpack. No development activity will be allowed between December 16 and March 15	BLM (White River Field Office)	The measure has been incorporated into the final design. Please refer to Appendix AA.

Source: Restrictions are verbatim from BLM (2016) and TransWest (n.d. [2021]:Appendix Z).

N/A = Not applicable, Western=Western Area Power Administration,

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Attachment C:

TransWest Express Transmission
Project Habitat Equivalency Analysis
Technical Document for Colorado

OCTOBER 2022

PREPARED FOR

TransWest Express LLC

PREPARED BY

SWCA Environmental Consultants

ATTACHMENT C:
TRANSWEST EXPRESS TRANSMISSION PROJECT
HABITAT EQUIVALENCY ANALYSIS TECHNICAL
DOCUMENT FOR COLORADO

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SWCA Project No. 58206

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1 INTRODUCTION

TransWest Express LLC (TransWest) intends to construct, operate, and maintain the TransWest Express Transmission Project (TWE Project, or Project), a ± 500 kilovolt (kV) extra-high-voltage regional transmission system that will extend across four states from south-central Wyoming to southern Nevada. At the request of TransWest, SWCA Environmental Consultants (SWCA) has developed a habitat equivalency analysis (HEA) model for the purposes of quantifying 1) the losses of greater sage-grouse (GRSG) (*Centrocercus urophasianus*) habitat function caused by construction and operation of the TWE Project and 2) the gains of habitat function resulting from conservation and mitigation. The HEA model considers the biophysical attributes (i.e., natural environment¹ and built environment²) of GRSG seasonal habitats to provide a measure of habitat function across multiple spatial scales. The level of GRSG habitat function, expressed in the HEA model as *habitat services*, is scored using a habitat metric.

The habitat metric scores key habitat elements for the species. The habitat metric consists of two primary components: habitat variables, which produce the natural environment habitat score, and modifier variables, which produce the built environment modifier score. The product of the natural environment habitat score and the built environment modifier score is the baseline habitat service score. Modeled changes in the habitat service scores over time are used to quantify conservation benefits from mitigation projects, as well as the direct and indirect effects of the Project. The measures of habitat services provide a common “habitat currency” that can be used to ensure accurate accounting of habitat gains and losses.

The HEA model quantifies gains and/or losses of habitat services across multiple Project milestones (e.g., baseline, construction, operation, and reclamation milestones) and spatial scales that correspond to the direct and indirect impacts during each Project milestone. Differences between habitat service scores before Project construction (the baseline milestone) and the habitat service scores at and between each subsequent Project milestone are calculated and summed to estimate the total habitat losses or gains that would result from implementation of the Project. Estimated losses of habitat services that result from construction and operation of the Project is the value from which the final mitigation requirement is quantified. The following sections describe the methods and results of the HEA analysis for the Project.

2 OVERVIEW OF THE HABITAT EQUIVALENCY ANALYSIS PROCESS FOR THE PROJECT

Development of the HEA process for the Project required close coordination among the Bureau of Land Management (BLM), other appropriate agencies, and stakeholders (the HEA Technical Advisory Group [HEA TAG]). The record of decision (ROD) describes the stakeholder coordination and HEA process developed for the Project (BLM 2016). Such coordination ensures that the best available scientific data are used, the habitat service metric is appropriate for resources in the Project area, the results of the HEA are understood, and the compensation offsets the interim and permanent loss of habitat services modeled. The following steps have been completed as part of the development of the HEA for the Project.

1. Establishing baseline habitat services prior to disturbance.

TransWest worked closely with the HEA TAG to finalize a habitat services metric that quantified the baseline GRSG habitat services available prior to Project construction. In Colorado, baseline condition includes the constructed Gateway South Transmission Line, which the Project will co-

¹ The natural environment refers to the geophysical and biological features of the habitat that can be used to predict habitat functionality (e.g., sagebrush cover, sagebrush height, and distance to lek).

² The built environment refers to anthropogenic features that directly or indirectly affect the usability of habitat (e.g., roads, transmission lines, and cities).

locate along. The Gateway South project is currently in construction and is an existing transmission line for consideration of co-location consistent with HEA TAG guidance. The habitat services metric has been updated with the most recent available science since the publication of the Project final environmental impact statement (FEIS) (BLM 2015) and is consistent with the ROD and the metric used for the final compensatory mitigation plan for the Shirley Basin to Jim Bridger segment of the Gateway West Transmission Line (PacifiCorp 2019), which is co-located with the Project in Wyoming. Section 3 provides information related to the development of the habitat services metric that served as the basis for quantifying baseline habitat services and determining Project impacts and appropriate mitigation.

2. Quantifying the permanent and interim losses to the baseline service level that result from the Project disturbance.

Permanent and interim losses of habitat services anticipated due to construction and operation of the Project were quantified as described in Section 4.0. These are the habitat losses (measured in discounted service-acre-years [DSAYs]) that remain after accounting for reclamation and vegetation recovery in the right-of-way (ROW) over the life of the Project; they provide the basis for the mitigation required for the Project.

3. Identifying mitigation to be used to compensate for lost services.

TransWest is in the process of identifying conservation credit sites that will compensate for the permanent and interim losses of habitat services for the Project. Section 5 describes the methods that were used to quantify habitat service gains resulting from mitigation projects.

4. Quantifying the amount of mitigation necessary to compensate for the permanent and interim losses to baseline services.

The average habitat service gain per acre was quantified for a hypothetical conservation credit site with an average habitat service value of 15.0. The resulting values were balanced with the services lost to determine the size of project necessary (in acres) to offset the permanent and interim loss of GRSG habitat services resulting from development and operation of the Project (Section 6).

3 HABITAT SERVICE METRIC

To quantify the habitat services (i.e., GRSG habitat functionality) provided by an ecosystem, a habitat service metric was developed that scores key habitat elements for GRSG. Scoring habitat services is a critical step in the HEA process because it provides a way to quantitatively measure the quality of specific habitat functions in a specific area. The habitat metrics used in the HEA must capture the relative differences in the quantity of services provided before, during, and after construction and mitigation activities. The habitat services measured have three components—land area, service level, and time—and are expressed in service-acres (1 year) or service-acre-years (service-acres summed over multiple years).

The GRSG habitat services metric for the Project was developed collaboratively by the HEA TAG, and then revised and finalized in coordination with the individual state wildlife agencies. The metric includes variables identified in the peer-reviewed literature as having influence on the quality of GRSG natural environment (Table 1) and built environment (Table 2). These variables are limited to those for which reliable and consistent data are available across the Project area. The scores and modifier values for this HEA are primarily based on information contained in the literature regarding GRSG habitat use and selection. When the literature does not allow for direct quantification of the HEA scores, professional judgment informed by available peer-reviewed literature and coordination with academic and agency species biologists was used.

Table 1. Additive Variables Used to Score the Natural Environment in the GRSG Habitat Metric

Natural Environment Variables	3	2	1	0
Percent slope	<10%	10%–30%	30%–40%	>40%
Distance to occupied lek [*] (kilometers)	0.0–6.4	6.4–8.5	>8.5	N/A
Sagebrush abundance index (% of vegetation that is sagebrush within a 1-square-kilometer moving window)	50%–100%	30%–50%	10%–30%	0%–10%
Percent sagebrush canopy cover	15%–35%	5%–15% or >35%	1%–5%	<1%
Sagebrush canopy height (centimeters)	30–80	20 – <30 or >80	5–20	<5
Distance of habitat to sage- or shrub-dominant vegetation (m)	<90	90–275	275–1,000	>1,000

* This variable considers leks classified as active, occupied, undetermined, or unknown.

Table 2. Variables Used to Quantify the Built Environment in the GRSG Habitat Metric

Impact or Modifier Type	Variable
Land cover, landform, and vegetation modifiers	Land cover class
Anthropogenic modifiers	Oil and gas well pad density
	Transmission lines 115 kV and larger
	Agriculture, mining, and other large-scale land conversion processes
	Roads, railroads, urban areas, pipelines, and active construction sites
	Compressors, terminals, active mines, and similar noise sources
	Wind facilities
	Other impact types

For each of the natural environment variables, a habitat service score ranging from 0 to 3 (zero to high services) was assigned. When a basic life requisite of GRSG is absent (e.g., vegetation is absent, the area is forested, or high levels of disturbance are present), the cell³ being scored is assigned a total service value of 0. When a measurement for a particular variable within the metric (e.g., Variable 04, % sagebrush canopy cover) matches literature-based descriptions of no-value, poor, moderate, or optimal conditions, that variable is given the corresponding score of 0 (contributing no value to habitat), 1 (poor habitat), 2 (moderate habitat), or 3 (optimal habitat). For example, sagebrush canopy cover less than 1% would score a 0, canopy cover of 1% to 5% would score a 1, canopy cover of 5% to 15% or greater than 35% would score a 2, and 15% to 35% canopy cover would score a 3 for that variable. Given three natural environment variables, the total potential natural environment score for optimal habitat is 18 (6 variables * 3 score = 18 score).

For each of the built environmental variables, a habitat modifier function was developed to quantify the percent impact that would be applied to the built environmental score from the direct or indirect effects of a particular impact modifier. When density or infrastructure (e.g., well pad density) is highest, impacts to habitat are greatest. Similarly, habitat impacts closer to operating infrastructure (e.g., roads) are greater than impacts farther from infrastructure. For example, habitat services are reduced by 100% (no habitat functionality) within 25 meters (m) of state highways and county roads, 75% between 25 m and 100 m

³ Habitat services are calculated in a geospatial platform at a 30-m pixel resolution (30 × 30-m raster cell, 900 m²) to quantify estimates of habitat function. Each cell in a layer representing each HEA variable receives a score in the established range developed for that variable (i.e., 0–3 [natural environment], 0–1 [built environment]). Layers for all HEA variables are then combined to develop a landscape-scale model representing habitat function.

from roads, 50% between 100 m and 300 m from roads, 25% between 300 and 500 m from roads, and 0% (full functionality of habitat) at distances greater than 500 m from roads.

3.1 Natural Environment Variables

The natural environment was scored using variables identified in the peer-reviewed literature as representative of GRSG habitat. Habitat service levels are intended to reflect both the quality of the habitat and the ability of the birds to use the habitat. For each of the six variables, a habitat service score ranging from 0 to 3 (no services [contributing no value to habitat] to high services [optimal habitat]) was assigned. Scoring habitat services is a critical step in the HEA process because it provides a way to measure the relative quality of specific habitat functions in a specific area. Scoring of the variables is categorical, and each variable receives the same weight in the natural environment habitat score. This approach is based on the best available data and is consistent with the general approach of LaGory et al. (2012) and Stiver et al. (2015).

Although the individual variables are not weighted, the number of variables relating to a habitat attribute (e.g., three for vegetation vs. one for slope) give some attribute categories more influence than others. In the metric, there are three variables that score sagebrush characteristics (sagebrush abundance index, sagebrush % canopy cover, and sagebrush canopy height), so areas that are not dominated by sagebrush will score low for these three variables, resulting in a lower overall score.

GRSG habitat suitability publications vary in their baseline environmental conditions affecting a particular study site. Even studies within the same state may describe different suitable habitat conditions depending on elevation, precipitation zone, and other geographic or climatic factors affecting each study site. The habitat natural environment variable scoring described below relies primarily on information presented in BLM et al. (2000), Cagney et al. (2009), Connelly et al. (2000), Connelly et al. (2011), and other summary publications. Specific citations are given to support the habitat scoring when applicable.

The natural habitat score is calculated as the sum of the scores for each of the habitat indicator variables (see Table 1). Equation 1 illustrates the calculation of the natural environment score. Appendix B-1 illustrates the final output for each natural environment variable.

Equation 1

$$\text{Natural Environment Score} = (\text{Percent slope score}) + (\text{Distance to occupied lek score}) + (\text{Sagebrush abundance score}) + (\text{Percent sagebrush canopy cover score}) + (\text{Sagebrush canopy height score}) + (\text{Distance to sage or shrub score})$$

3.1.1 Percent Slope

Slope was used to refine GRSG habitat potential. GRSG generally use flat or gently sloping terrain (Connelly et al. 2011; Eng and Schladow 1972; Nisbet et al. 1983; Rogers 1964). Beck (1977) plotted the distribution of 199 GRSG flocks in Colorado and found that 66% of flocks were on slopes less than 5% and that only 13% of flocks were on slopes greater than 10%. Areas with slopes greater than 40% are unsuitable for nesting habitat (Lincoln County Sage Grouse Technical Review Team 2004) but still have some value to GRSG and should be retained in the model (informed by peer reviewed literature and coordination with agency species experts). Therefore, areas with less than 5% slope received a habitat service score of 3, and areas with slopes exceeding 10% subjectively received incrementally lower habitat service scores. Slopes greater than 40% did not add value to the habitat and received a score of 0 for this variable, but these areas may provide habitat services depending on the scores for the other variables.

A terrain roughness index was evaluated for use in place of the slope variable because some studies have shown that the former is a better indicator of GRSG use (Carpenter et al. 2010; Doherty et al. 2008; Doherty, Naugle, and Walker 2010; Dzialak et al. 2011). However, there was substantial variation in the methods used to calculate the terrain roughness index (e.g., measure of roughness used and analysis window size) and region evaluated (e.g., Alberta, Canada, vs. Powder River Basin, Wyoming) by these studies. Given this variation, it was not possible to identify literature-supported cutoffs between scores for use of terrain roughness in the model.

3.1.2 Distance to Lek

Current GRSG habitat management guidance uses occupied leks, a gathering of males for mating purposes, as focal points for nesting habitat management (Connelly et al. 2000; Connelly et al. 2011); therefore, distance to lek⁴ was used as a variable in the habitat services metric. These guidelines recommend protecting sagebrush communities within 3.2 kilometers (km) of a lek in uniformly distributed habitats and 5.0 km in non-uniformly distributed habitats. Holloran and Anderson (2005) studied nesting GRSG at 30 leks in central and western Wyoming and determined that 45% and 64% of female GRSG nested within 3.2 km and 5.0 km of the lek where the hens were radio-collared, respectively. Moreover, statistical analyses suggested that the area of interest for nesting GRSG should be truncated at 8.5 km from a lek. Similar frequencies are reported in Cagney et al. (2009): 66% within 5.0 km and 75% within 6.4 km of a lek where the female bred.

Female GRSG do nest at distances greater than 8.5 km (the farthest distance reported in Holloran and Anderson [2005] was 27.4 km), so all distances greater than 8.5 km from occupied leks received a service score of 1 to reflect some potential use by nesting GRSG. Areas within 6.4 km of a lek provide the highest services level, because they provide female grouse with forage, roost sites, and cover from predators or inclement weather during the lekking season, in addition to containing lekking habitat and nesting habitat (Cagney et al. 2009); these areas were assigned a service score of 3 for this variable. Areas between 6.4 km and 8.5 km were assigned a score of 2 for this variable.

3.1.3 Sagebrush Abundance Index

GRSG are sagebrush obligates, and thus sagebrush abundance and quality are strong predictors of GRSG use and persistence. Walker et al. (2007) found that the proportion of habitat that was sagebrush within 6.4 km of a lek was a strong predictor of lek persistence in the Powder River Basin of Wyoming. The moving window is an analysis area that is larger than and centered on the cell being scored; in this case, the window is a 6.4-km buffer that moves as the cell being scored is changed. Areas with less than 30% sagebrush within 6.4 km of the lek center had a lower probability of lek persistence. Aldridge and Boyce (2007) also used a moving window (1 km²) to measure sagebrush cover and abundance. Their resource selection function found that GRSG selected nesting habitat that contained large patches (1 km²) of sagebrush with moderate canopy cover and moderate sagebrush abundance (i.e., a heterogeneous distribution of sagebrush). Carpenter et al. (2010) found similar results in Alberta, Canada; their top resource selection functions included a quadratic function for sagebrush abundance, which indicates that areas of moderate sagebrush abundance were selected more frequently than areas of homogeneous sagebrush.

Aldridge et al. (2008) (per Wisdom et al. 2011) found that at least 25% of the landscape in a 30.77-km analysis area needed to be dominated by sagebrush for GRSG persistence, with 65% being preferred. Wisdom et al. (2011) found that landscapes with less than 27% sagebrush were not different from

⁴ The distance to lek variable refers to the distance between the lek location and suitable nesting habitat.

landscapes from which GRSG have been extirpated. Similar to Aldridge et al. (2008), Wisdom et al. (2011) found that 50% sagebrush across a landscape was a good indicator of GRSG persistence.

Coordination with academic and agency biologists and review of available peer-reviewed literature indicated that GRSG prefer higher sagebrush abundance in the southern part of their range than is indicated by these studies. For example, the Colorado Parks and Wildlife Avian Research Center has generally found a positive linear relationship between sagebrush abundance and measures of habitat selection (personal communication between Brian Holmes, Colorado Parks and Wildlife, and Jon Kehmeier, SWCA, on February 13, 2013). Colorado Parks and Wildlife has not observed an upper inflection point in the proportion of the landscape covered in sagebrush where use or selection begins to drop, and the agency suggests that the difference may be because of the structure and composition of the sagebrush community (i.e., silver sagebrush mixed grassland rangelands of Alberta [Aldridge and Boyce 2007; Carpenter et al. 2010] vs. big sagebrush steppe [Project area]).

Sagebrush covering 50% to 100% of the landscape scored a 3 for this variable (Aldridge et al. 2008; Wisdom et al. 2011; and the professional judgment of academic and agency biologists). Sagebrush covering 30% to 50% scored a 2 for this variable (Aldridge et al. 2008). Sagebrush covering 10% to 30% scored a 1 for this variable (Walker et al. 2007; Wisdom et al. 2011), and sagebrush covering less than 10% scored a 0 for this variable (professional judgment of academic and agency biologists).

3.1.4 Sagebrush Canopy Cover

Recommended sagebrush canopy cover (the proportion of land area covered by sagebrush crowns, as viewed from the air) for GRSG habitat varies seasonally. Seasonal habitats were not modeled, but seasonal differences in the selection for sagebrush cover were considered when developing variable scores. The seasonal habitat needs of GRSG are described below, followed by scoring of percent sagebrush cover in the habitat services metric.

3.1.4.1 SEASONAL HABITAT USE

3.1.4.1.1 Nesting

Connelly et al. (2000) cite 13 references to sagebrush coverage that ranges from 15% to 38% mean canopy cover surrounding the nest. Citations contained within Crawford et al. (2004) report 12% to 20% cover and 41% cover in nesting habitat. In their species assessment, Connelly et al. (2000) conclude that 15% to 25% canopy cover is the recommended range for productive GRSG nesting habitat. This is also the range identified in the GRSG habitat assessment framework (Stiver et al. 2015) as providing the highest service level for GRSG based on a review of the available literature. Wallestad and Pyrah (1974) reported that successful nests were in stands where sagebrush cover approximated 27%. This cover range is used as a goal in some GRSG management guidelines (BLM et al. 2000; Bohne et al. 2007). Cagney et al. (2009) provide guidelines for grazing in grouse habitat that use information synthesized from more than 300 sources, and they state that hens tend to select an average 23% live sagebrush canopy cover when selecting nesting sites.

GRSG in Utah use habitats with higher sagebrush canopy cover than is observed in the northern and eastern portions of the species' range, possibly because of the relative scarcity of understory grasses in Utah (personal communication between Renee Chi, BLM, and Ann Widmer, SWCA, on March 22, 2013). Nest sites on Wildcat Knoll (part of the Emery-Sanpete population of Utah) were located in areas with an average of 33.0% shrub canopy cover for successful nests and 22% for unsuccessful nests (Perkins 2010). Nests in Parker Mountain were located at sites with an average canopy cover of 35.5% for big sagebrush and 32.0% for big sagebrush mixed with black sagebrush (Chi 2004; personal

communication between Renee Chi, BLM, and Ann Widmer, SWCA, on March 22, 2013). In the Sheeprock GRSG population, nest site shrub canopy cover measured an average of 62.0% in 2005 and 83.5% in 2006 (Robinson 2007).

3.1.4.1.2 Brood Rearing

Connelly et al. (2000) found that productive brood-rearing habitat should include 10% to 25% cover of sagebrush. This is the range used as a goal in GRSG management guidelines (BLM et al. 2000; Bohne et al. 2007). Although sagebrush is a vital component of GRSG habitat, very thick shrub cover may inhibit understory vegetation growth and reduce the birds' ability to detect predators (Wiebe and Martin 1998).

Again, GRSG in Utah may use areas with higher canopy cover than is typical throughout the northern and eastern parts of their range. Grouse in the Sheeprock population were documented using areas with an average shrub canopy cover of 73% during brood rearing in 2005 and 2006 (Robinson 2007).

3.1.4.1.3 Winter

Connelly et al. (2000) cite 10 references to sagebrush coverage in winter-use areas that range from 15% to 43% mean canopy cover (Crawford et al. [2004] also cite two of these references in their assessment); however, they considered a canopy of 10% to 30% cover above the snow as a characteristic of sagebrush needed for productive GRSG winter habitat. This is the cover range used as a goal in GRSG management guidelines (BLM et al. 2000; Bohne et al. 2007). GRSG in Utah may prefer higher cover in winter. In Emma Park, areas of high sagebrush cover were used disproportionately to their availability on the landscape, with an average of 38.3% sagebrush canopy cover in winter-use areas (Crompton and Mitchell 2005).

3.1.4.2 SCORING IN HABITAT SERVICES METRIC

In general, the recommended sagebrush cover for nesting habitats was intermediate to and overlapped that of brood-rearing and winter habitats. Thus, favorable conditions for nesting received the highest scores for percent sagebrush cover in the GRSG habitat services metric.

This variable used the scores assigned by Stiver et al. (2015) for sagebrush cover categories in GRSG nesting habitat, with a slight adjustment to account for the use of higher canopy cover in Utah. This adjustment is also consistent with the Colorado Greater Sage-Grouse Conservation Plan (Colorado Division of Wildlife et al. 2008). Sagebrush percent canopy cover of 15% to 35% was assumed to provide the highest level of service (score of 3) to nesting GRSG. This includes canopy covers that are 10% higher than the average ranges provided in Connelly et al. (2000) and Cagney et al. (2009). Areas with slightly less or more cover than this (5%–15% or greater than 35%) received a habitat service score of 2. Habitats with 1% to 5% cover received a score of 1, and those habitats with less than 1% cover received a score of 0.

3.1.5 Sagebrush Canopy Height

Sagebrush canopy height is an important component of nesting and winter habitat because it affects how well nests are concealed from predators and how much food is available above the snow. As described above, seasonal habitat models will not be developed for the Project. However, seasonal habitat requirements were considered when developing variable scores. The seasonal habitat preferences of GRSG are described below and are followed by the scoring of sagebrush height in the habitat services metric.

3.1.5.1 SEASONAL HABITAT USE

3.1.5.1.1 Nesting

Gregg et al. (1994, cited in Crawford et al. 2004) found that the area surrounding successful nests in Oregon consisted of medium-height (40–80 centimeters [cm]) sagebrush. Connelly et al. (2000) cite 11 references to sagebrush height that ranges from 29 to 79 cm mean height. In their assessment, Connelly et al. (2000) conclude that sagebrush with heights of 30 to 80 cm is needed for productive GRSG nesting habitat in arid sites, and sagebrush with heights of 40 to 80 cm is needed in mesic (temperate) sites. These ranges are supported by Stiver et al. (2015), who recommend a range of 30 to 80 cm, and BLM et al. (2000), who state that optimum GRSG nesting habitat consists of sagebrush stands containing plants 40 to 80 cm tall.

3.1.5.1.2 Winter

Important structural components in winter habitat include medium to tall (25–80 cm) sagebrush stands (Crawford et al. 2004). Connelly et al. (2000) cite 10 references for sagebrush height in winter habitat that range from 20 to 46 cm above the snow. Two studies measured the entire plant height and provided a range from 41 to 56 cm. In their assessment, Connelly et al. (2000) conclude that characteristics of productive winter habitat include sagebrush that is 25 to 35 cm in height above the snow. This is the height range used as a goal in GRSG management guidelines (BLM et al. 2000; Bohne et al. 2007).

3.1.5.2 SCORING IN THE HABITAT SERVICES METRIC

Sagebrush canopy heights that provide high-quality nesting habitat generally also provide high-quality winter habitat for GRSG. Thus, canopy heights that provide favorable conditions for nesting received the highest scores for this variable in the GRSG habitat services metric.

The sagebrush cover scores assigned for nesting habitat in the GRSG habitat assessment framework by Stiver et al. (2015) to different sagebrush cover categories were assigned to this variable. Areas of sagebrush with a height of 30 to 80 cm were assigned a habitat service score of 3. As sagebrush canopy height decreases, the value of a sagebrush plant to provide cover for nesting females and their nests is diminished. Additionally, low-lying sagebrush is less available to GRSG during the winter because of snow cover. Areas with canopy heights greater than 80 cm provided intermediate levels of service because they may provide relatively poor cover for nesting GRSG and have foliage that is difficult for GRSG to access during mild and moderate winters. Consistent with Stiver et al. (2015), sites with sagebrush from 20 to 30 cm tall or greater than 80 cm in height received a score of 2. Areas with minimal sagebrush canopy heights were considered to have the lowest habitat service value, so sagebrush that ranged from 5 to 20 cm in height received a score of 1 and sagebrush that was less than 5 cm in height received a score of 0.

3.1.6 Distance to Vegetation Dominated by Sagebrush or Shrub

GRSG use shrubby habitats including sagebrush during the brood-rearing season (Connelly et al. 2000) and for grouse movement and dispersal (Stiver et al. 2015). Close proximity to shrubby vegetation increases the service value of all vegetation types modeled because shrubby vegetation provides cover from predators, facilitates grouse movement, and supports population connectivity.

The Lincoln County Sage Grouse Technical Review Team (2004) identified proximity to sagebrush cover as an important component in habitat suitability of non-sagebrush, brood-rearing habitats (e.g., mesic lowland habitats, hay meadows) and considered brood-rearing areas within less than 100 yards (91 m),

100 to 300 yards (91–274 m), and greater than 300 yards (275 m) of sagebrush cover as suitable, marginal, and unsuitable habitat, respectively. Similarly, Stiver et al. (2010) considered mesic habitats less than 90 m, 90 to 275 m, and greater than 275 m of sagebrush to be suitable, marginal, and unsuitable late brood-rearing/summer habitat, respectively. These categorizations support the concept of increasing services level with proximity to shrubs, particularly sagebrush.

This variable (distance to vegetation dominated by sagebrush or shrub) measured the distance of the cell being scored (regardless of its vegetation type) to the next nearest cell that was dominated by sagebrush or a shrub species, including willows. For this variable, cells less than 90 m, 90 to 275 m, 275 to 1,000 m, and greater than 1,000 m to a cell dominated by a shrub species were assigned scores of 3, 2, 1, and 0, respectively. The scoring was based on the breakpoints identified in the literature for distances up to 275 m and professional judgment by academic and agency biologists for distances greater than 275 m. The scores were applied to all vegetation types because this variable is relevant to bird movement and dispersal from all habitat types.

3.2 Built Environment Variables

The following describes the modifier variables that were applied to the natural environment habitat score to calculate the habitat service scores. Methods are based on the latest available peer-reviewed science related to GRSG and their habitat, as well as close coordination with academic and agency species experts. Table 2 identifies the impact or modifier types that will be used to calculate final HEA scores.

For each modifier variable, a score adjustment factor between 0 and 1 was assigned to reflect the level of expected impact that the modifier variable has on habitat functionality. Where direct or indirect impacts overlap, the final disturbance multiplier will be the product of the individual modifier variables for each anthropogenic effect type. The product of the following individual modifier variables for all impact types will be multiplied by the natural environment habitat score to calculate the final HEA habitat service score. Appendix B-2 illustrates the final output for each modifier variable.

The built environment score is the product of all the impact or modifier variables in Table 2. Equation 2 describes the calculation of the built environment score:

Equation 2

Built Environment Score = [Product of all habitat modifiers in Table 2]

3.2.1 Vegetation and Land Cover Impact Types

3.2.1.1 LAND COVER CLASS

When a basic life requisite of GRSG is absent from an area, the area is not considered GRSG habitat. Land cover classes that do not provide these basic life requisites for GRSG may include urban, disturbed footprints, open water, certain types of agriculture (primarily orchards and row crops), and forests (Appendix A). Areas with these unusable land cover classes are assigned a score adjustment factor of 0 (resulting in a functional habitat score of 0) (Table 3). Recent burns (occurring within the past 10 years) were previously classified as unusable land cover classes in past metrics; however, all recent burns will be reclassified as a grass cover type and modeled as such in the HEA.

Table 3. Score Adjustment Factors for the Land Cover Class Habitat Modifier Variable

Land Class Designation	Score Adjustment Factor
Suitable land class/no disturbance	1
Unsuitable land class/disturbed land	0

3.2.2 Anthropogenic Impact Types

3.2.2.1 OIL AND GAS WELL PAD DENSITY

Oil and gas well pads consistently had a deleterious effect on habitat selection by GRSG and on lek persistence and attendance, although the size of the effect varied by region, development type, and season (e.g., Blickley et al. 2012a; Dinkins et al. 2014a; Doherty et al. 2008; Doherty, Naugle, and Walker 2010; Johnson et al. 2011; Walker et al. 2007). At a local scale, recorded noise from natural gas drilling rigs (continuous noise less than 2 kilohertz [kHz], simulating a 400-m proximity) and traffic on gas-field access roads (intermittent noise less than 2 kHz) resulted in immediate decreases in lek attendance over three seasons (29% and 73% reductions, respectively) in a field experiment in Fremont County, Wyoming (Blickley et al. 2012a). Noise may not be the only mechanism for an effect, though; results from studies of GRSG response to natural gas development suggest that birds may have been avoiding human activity rather than the infrastructure itself (Dzialak et al. 2011; Holloran et al. 2015).

At a larger landscape scale, well pad density (ranging from 3 to 5 km apart) rather than distance to well appears to significantly influence lek persistence (Doherty, Naugle, and Evans 2010; Walker et al. 2007), lek attendance (Doherty, Naugle, and Evans 2010; Johnson et al. 2011), and habitat selection (Dinkins et al. 2014a; Doherty et al. 2008; Holloran et al. 2015). The density of oil and gas well pads (number per km²) within 3.0 km reduced the probability of habitat selection by hens in the early brood rearing (odds ratio 0.47) and late brood rearing (odds ratio 0.57) seasons in south-central Wyoming (Dinkins et al. 2014a). The effect was less pronounced in the winter; within a 4-km² area, the probability of habitat selection by hens was reduced by 3% with each additional structure (odds ratio 0.97) (Doherty et al. 2008). Increasing the density of oil and gas well pads (number per km²) within 3.2 km increased the risk of lek loss and resulted in a decline in the number of active leks between 1997 and 2007 in Wyoming (Doherty, Naugle, and Evans 2010) (Table 4).

Table 4. Decline in Active Leks by Well Density in GRSG Management Zones I and II from 1997 to 2007

Number of Wells within a 3.2-km Buffer	Decline in Active Leks (%)		Decline in Males (%) on Remaining Active Leks		Average of Effect
	Zone I*	Zone II*	Zone I*	Zone II*	
1–12	-0.70%	-1.00%	-2.10%	0.00%	-1%
13–39	-11.50%	-12.10%	-31.40%	-55.50%	-28%
40–100	-47.20%	-16.10%	-32.60%	-59.00%	-39%
100–199	-55.10%	N/A	-77.30%	-69.50%	-67%

Source: Doherty, Naugle, and Evans (2010)

* Based on Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones (Connelly et al. 2004; Stiver et al. 2006), which are delineated by floristic provinces and used to group sage-grouse populations for management actions.

Landscape-level effects are more relevant for the purposes of mitigation and land use planning than are site-level effects (Decker et al. 2017). However, the large buffer sizes (3.2 km and 5.0 km) were not well suited for evaluations of site-level effects in the model, as previously described for the sagebrush habitat indicator. A smaller 1-km buffer was selected for this modifier variable because it characterized habitat heterogeneity at a scale that is useful for Project and mitigation siting. Additionally, this scale maintains the quality of habitat along the edges of developed well fields better than a larger-scale assessment area does. The well density categories identified by Doherty, Naugle, and Evans (2010) were used to set the adjustment factor levels with the average of the effect (from Table 4) set as the score adjustment factor (Table 5, Figure 1). The number of well pads in each category was adjusted to maintain the same well density at the 1-km buffer scale as was identified as being significant at the 3.2-km scale.

Table 5. Score Adjustment for Well Density within the 1-km Buffer

Well Pad Density (number of well pads within 1-km buffer)	Approximate Well Pad Spacing	Reduction in Habitat Function	Score Adjustment Factor
0–1	640+ acres	0%	1.0
>1–4	160–640 acres	30%	0.7
>4–10	64–160 acres	40%	0.6
>10–20	32–64 acres	70%	0.3
>20–40	16–32 acres	90%	0.1
>40	<16 acres	100%	0.0

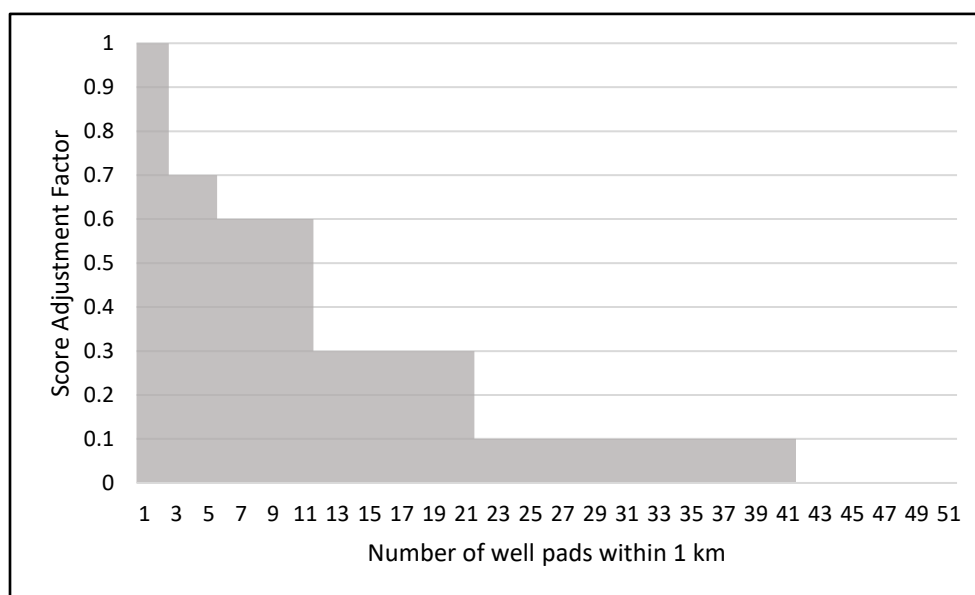


Figure 1. Adjustment of scores for number of well pads within a 1-km buffer.

3.2.2.2 TRANSMISSION LINES 115-KILOVOLT AND LARGER

The effects of transmission lines on GRSG have been considered in several recent studies of habitat use and lek attendance (e.g., Dinkins et al. 2014b; Gibson et al. 2018; Gillan et al. 2013; Hanser et al. 2011; Johnson et al. 2011; Knick et al. 2013; LeBeau 2012; Shirk et al. 2015; Walker et al. 2007) but have been difficult to quantify because of several confounding factors (Walters et al. 2014). Most of these studies group transmission lines with distribution lines and telephone lines (i.e., a diverse set of “power lines”

with potentially diverse effects); are unable to isolate the effects of power lines co-located with roads, houses, or other energy infrastructure; and inadequately account for underlying habitat quality as a predictor of habitat use and GRSB survival. For these reasons, it is not surprising that among these studies there is no consensus that transmission lines or power lines have any effect on GRSB at the individual or population level.

There is some evidence of decreased use of habitat (avoidance) by GRSB near power lines and transmission lines (e.g., Braun 1998)⁵; however, the specific mechanism, magnitude, and extent of avoidance are unknown. A spatial analysis of GRSB telemetry data from west-central Idaho detected significantly fewer occurrences of GRSB within 600 m of power lines than was predicted by the null model (Gillan et al. 2013); however, the change in the magnitude of use was not evaluated (personal communication between J. Gillan, New Mexico State University, and Ann Widmer, SWCA, July 7, 2015). Models of GRSB habitat use derived from the locations of GRSB scat (i.e., pellets) in the Wyoming Basin Ecoregional Assessment areas considered biotic, abiotic, and anthropogenic effects and identified distance to power line to be a significant predictor (Hanser et al. 2011). The results of the study indicate an avoidance effect that decreases with distance from the line. However, the size, number, location, and configuration of power lines evaluated were not described by Hanser et al. (2011), creating uncertainty in how to incorporate other aspects of the results to the model of a new transmission line. Expert opinion-based models of GRSB movement developed in Washington predicted that power lines would significantly reduce GRSB movement to distances greater than 500 m; spatial patterns in gene flow and lek activity were consistent with model predictions (Shirk et al. 2015; Washington Wildlife Habitat Connectivity Working Group 2012). These results provide evidence of power line impacts, suggesting that avoidance behavior has the potential to result in a population-level effect.

Gibson et al. 2018 quantified the effects of the Falcon-to-Gondor 345-kV Transmission Line in Nevada on two GRSB populations over 10 years of operation. This study provides strong evidence of transmission line effects to GRSB demographic parameters (female survival, nest site selection and success, and brood survival), largely in part because of the length of the study, the large number of data points collected (GRSB locations and habitat measurements), and the statistical analysis that isolated the effects of the transmission line from the effects of habitat quality and other covariates. The authors identified several demographic parameters that were affected by the transmission line, and variation in the magnitude of the effect was largely explained by raven abundance. The authors also took the analysis a step further to estimate the impact that transmission lines have on females, nests, and chicks at the population level. Using lek attendance as a surrogate for population size, the authors estimated that population growth was reduced by 3% directly below the transmission line, and the effect decreased linearly with distance to 0% at 10 km from the Falcon-to-Gondor transmission line. Population growth was reduced by 8% directly below “all power lines” (transmission line and distribution lines grouped), and the effect decreased linearly with distance to 0% at 10 km.

Two indirect effect zones were defined for the transmission line habitat score modifier based on the literature:

- Avoidance (0–600 m [0.6 km])
- Decreased population growth (0–10,000 m [10 km])

Avoidance is a behavioral response by GRSB that has been documented in proximity to overhead transmission lines, although the mechanism for avoidance is unknown. It results in decreased use of habitat in areas within 600 m of a transmission line. Using professional judgment, it was decided that avoidance effect would increase proportionally with the number of transmission lines; where the lines are sited less than 1,000 m apart, the avoidance effect between these lines is multiplicative.

⁵ In this document, 115 kV was used as the threshold to differentiate between transmission lines and distribution (power) lines.

Decreased population growth is not behavioral and instead is a result of changes in population demographics (e.g., nest success and brood survival) that lead to the population-level impact described in Gibson et al. 2018. Based on this study, it affects the 10-km area on each side of an overhead transmission line. Raven abundance is the primary mechanism identified for decreased population growth. Where decreased population growth zones overlap or where one overlaps with an avoidance zone, the larger effect is modeled.

Both effects occur across all seasons, apply to both sexes and all age groups, and occur for the operating lifetime of the Project. The magnitude of the indirect effect is described for each zone below.

3.2.2.2.1 Avoidance (0–600 meters)

Reduced use (avoidance) near a transmission line is greatest directly under the line, decreasing out to 600 m, according to peer-reviewed literature. The avoidance effect was only modeled in cells with relatively high habitat scores, where the majority of GRSG habitat use occurs. The impacts of avoidance are expected to occur where GRSG use is consistently observed. While marginal or unsuitable habitats are occasionally used by GRSG, such use is often associated with movement patterns between patches of high-quality suitable habitat. These movement patterns include use of habitats within and adjacent to transmission line corridors and other energy corridors.

For the Project, avoidance was modeled in habitats with a final baseline score greater than 8.00 (before the application of transmission line effects). This score cutoff was determined by mapping telemetry and global positioning system (GPS)-tag relocations for GRSG within 20 km of the Project. Eighty percent of relocations occurred in habitats scoring 8.0 or greater. These data (18,258 relocation points) represent a subset of those data made available through the TransWest Express permitting process.

Avoidance is modeled as a loss in habitat functionality that decreases linearly from 75% loss immediately below the line to 0% loss 600 m from the line.⁶ The score adjustment factor is calculated as $[1 - 1.25(0.6 - x)]$, where x is the distance from the transmission line in km (Figure 2).

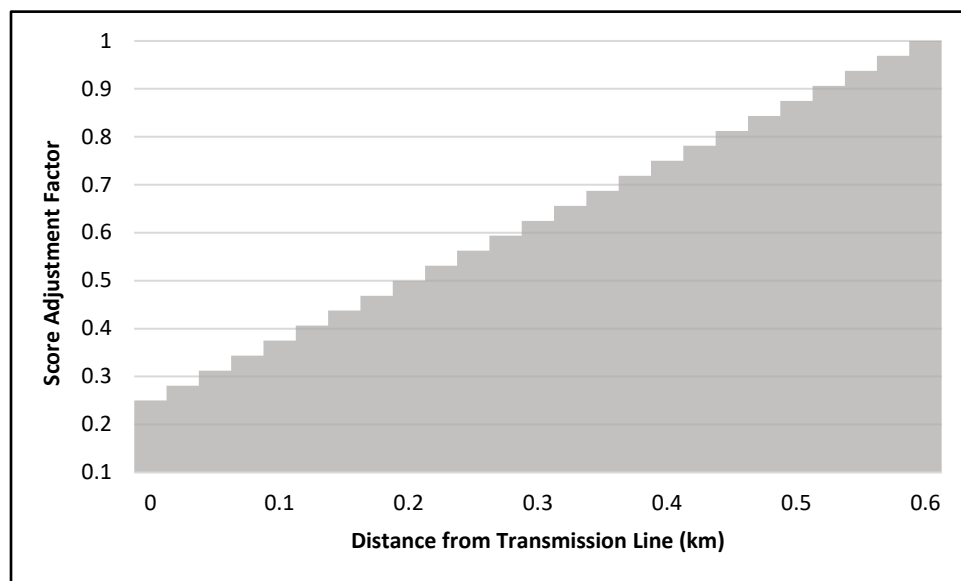


Figure 2. Adjustment of scores for habitat avoidance with proximity to the transmission line.

⁶ Professional judgment was used to develop the 75% reduction in use immediately below the line with the likelihood of use increasing with increasing distance from the transmission line.

3.2.2.2.2 Decreased Population Growth (0–10,000 meters)

Decreased population growth near transmission lines is modeled in all occupied habitat, regardless of raw habitat score. Decreased population growth is modeled as a loss of habitat functionality that decreases linearly from 3% directly below the line to 0% loss 10,000 m (10 km) from the line.⁷ The score adjustment factor is calculated as $[1 - 0.003(10 - x)]$, where x is the distance from the line in km (Figure 3). This approach is consistent with recommendations made by Gibson et al. 2018) for the Falcon-to-Gondor Transmission Line.

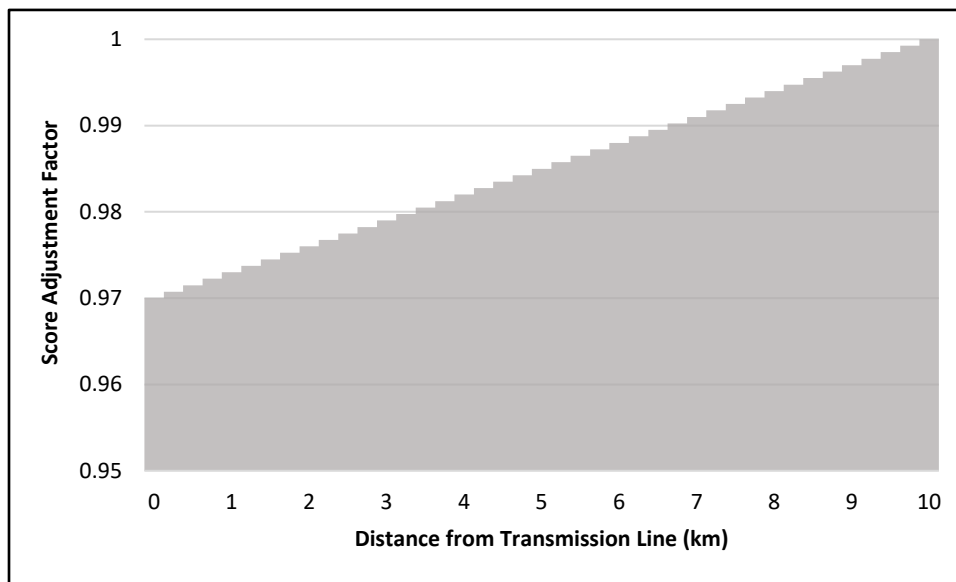


Figure 3. Adjustment of scores for decreased population growth with proximity to the transmission line.

3.2.2.3 AGRICULTURE, MINING, AND OTHER LARGE-SCALE LAND CONVERSION PROCESSES

Conversion of GRSG habitat to agricultural lands is another source of habitat loss and degradation of habitat value at the landscape scale (e.g., Knick et al. 2013; Smith et al. 2016). This same conversion process may also be present for other moderate- to large-scale land uses, including mining. In these settings, sagebrush is removed from the site and the land is converted to uses that provide no ecosystem services for GRSG.

The effects of mines on GRSG have not been specifically studied and are likely to vary widely based on the size, type of mine (e.g., surface or belowground), and infrastructure. Removal of vegetation during surface mining, for example, would make the area unsuitable for GRSG, similar to the conversion of sagebrush to agriculture. Landscapes in the process of reclamation, though, may provide functional habitat and will be reclassified as a grass cover type if data are not available to demonstrate that they meet reclamation standards.

In their survey of lek locations throughout the western half of the species range, Knick et al. (2013) found that the percent agriculture varied widely across individual lek locations, but less than 2% of the leks were in areas surrounded by greater than 25% agriculture within a 5-km radius, and 93% by less than 10%

⁷ The effects of transmission lines are being modeled, not the effects of “all power lines.” Distribution line data are not available for the entire analysis area. Without accurate and complete distribution line data, the baseline condition with existing power lines could not be accurately characterized and the baseline habitat scores would be inaccurate.

agriculture. Focusing on the northern Great Plains portion of the GRSG range, the study by Smith et al. (2016) found that the number of active leks decreases rapidly as the landscape is converted to agriculture. They estimated that a 10-percentage-point increase in the proportion of land that is agriculture within a 3.2-km radius (a 32.2-km² area) would result in a 51% decrease in the density of active leks (measured as active lek sightings per km²).

The habitat value in the model is reduced as the proportion of the surrounding landscape that is converted to other land uses through sagebrush removal increases, specifically the proportion of the area within a 3.2-km radius (Table 6, Figure 4). Habitats surrounded by less than 10% agriculture, mining, or other land conversion types within 3.2 km have no reduction in value in the model, consistent with the finding by Knick et al. (2013). A 10-percentage-point increase in the proportion of conversion is estimated to decrease the number of active leks by approximately 51% (Smith et al. 2016), so habitat value in the model is decreased by 50% where the surrounding area is 10% to 25% agriculture in areas with historic sagebrush landcover. Fewer than 2% of the leks are surrounded by greater than 25% agriculture (Knick et al. 2013). Where leks have greater than 25% agricultural cover within 3.2 km, the habitat value is reduced by 85%, which is consistent with the approximate reduction in lek activity predicted in Figure 4 of Smith et al. (2016).

Table 6. Score Adjustment Factor for Percent Agriculture, Mining, or Other Activities that Convert Sagebrush Habitat to Lands that Do Not Provide Ecosystem Services within a 3.2-km Radius

Percent Agriculture, Mining, or Other Land Conversion Activities within a 3.2-km Radius	Score Adjustment Factor	Source
0%–10%	1.00	Knick et al. (2013); Smith et al. (2016)
10%–25%	0.50	Smith et al. (2016)
25%–40%	0.15	Knick et al. (2013); Smith et al. (2016)
40%–60%	0.10	Smith et al. (2016)
>60%	0.00	Smith et al. (2016)

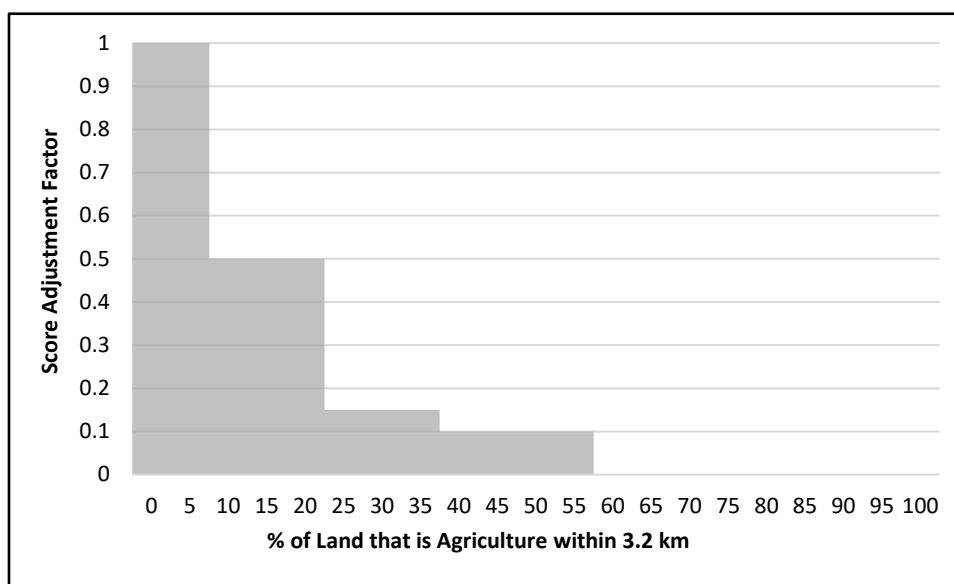


Figure 4. Adjustment of scores for conversion of sagebrush habitat by agriculture, mining, or other activities within a 3.2-km radius.

3.2.2.4 ROADS, RAILROADS, URBAN AREAS, PIPELINES, AND ACTIVE CONSTRUCTION SITES

According to the U.S. Fish and Wildlife Service (USFWS) threat assessment for GRSG, impacts from roads may include direct habitat loss, direct mortality, barriers to migration corridors, facilitation of predators, spread of invasive species, and other indirect impacts such as noise (USFWS 2010). This built environment variable focuses on the indirect effects of roads to GRSG habitat, as direct disturbances are accounted for in the other land cover variables. Research into the effects of roads on GRSG is limited and has produced varied results, likely because this feature is found throughout the species' range, making the effects difficult to isolate. According to the USFWS threat assessment, 95% of all GRSG habitats were within 2.5 km (1.5 miles) of a mapped road, and almost no area of sagebrush was greater than 6.9 km (4.3 miles) from a mapped road.

Data regarding how roads may affect seasonal habitat availability of individual GRSG by creating barriers or causing avoidance are particularly inconsistent. For instance, in Colorado, Rogers (1964) mapped 120 leks with regard to distance from roads and found that 42% of leks were more than 1.6 km from the nearest improved road but that 26% of leks were within about 90 m of a county or state highway, and two leks were on a road. Connelly et al. (2004) also note the use of roads for lek sites. LeBeau (2012) found evidence for avoidance of roads by hens in the nesting and brood-rearing seasons at one study site but not the other; avoidance by hens was documented at both sites during the summer season only. Similarly, Pruett et al. (2009) found that lesser prairie-chickens (*Tympanuchus pallidicinctus*) avoided one of the two highways in the study by 100 m; however, some prairie-chickens crossed roads and had home ranges that overlapped the highways, and, therefore, roads did not completely exclude them from neighboring habitat.

In contrast, Craighead Beringia South (2008) reported results from a 2007–2009 study of GRSG seasonal habitat use in Jackson Hole, Wyoming. Results indicate that GRSG avoid areas within approximately 100 m of paved roads. Similarly, Knick et al. (2013) found that high-value lek habitats had less than 1.0 km/km² of secondary roads, less than 0.05 km/km² of highways, and less than 0.01 km/km² of interstate highways. Male GRSG lek attendance was observed to decline within 3 km (1.9 miles) of a methane well or haul road with traffic volume exceeding one vehicle per day (Holloran 2005), and even light vehicular traffic (1 to 12 vehicles/day) has been found to substantially reduce nest initiation rates and increase the distance of nests from lek sites (Lyon and Anderson 2003). Johnson et al. (2011) examined the correlation between trends in lek attendance and the environmental and anthropogenic features within 5-km and 18-km buffers around leks. They found that lek attendance declined over time with length of interstate highway within 5 km, although the authors note that this trend was based on relatively few data points and no pre-highway data were available for comparison. Interstate highways greater than 5 km away and smaller state and federal highways had little or no effect on trends in lek attendance. Thresholds less than 5 km were not examined.

Roads can provide corridors for predators to move into previously unoccupied areas, with the potential to greatly increase their distribution. Mammals and corvids use linear features such as primary and secondary roads as travel routes (Connelly et al. 2004; Forman 2000; Forman and Alexander 1998; Knight and Kawashima 1993). Ravens, which are an important GRSG nest predator, have been documented following roads in oil and gas fields during foraging (Bui et al. 2010).

The expansion of road networks contributes to exotic plant invasions along roadsides and encroaching into surrounding habitats (Forman 2000; Forman and Alexander 1998; Gelbard and Belnap 2003), potentially decreasing the quality of the habitat for GRSG. A study of the vegetation community adjacent to four-wheel drive roads that were paved on the Colorado Plateau of southern Utah measured increased cover of exotic plants more than 50 m into the interior of vegetation patches (Gelbard and Belnap 2003).

Gelbard and Belnap (2003) concluded that the increased rate of establishment of these exotic plants was associated with road construction, road maintenance activities, and vehicle traffic, rather than underlying site conditions.

Noise levels are one of the only road effects on GRSG that have been experimentally manipulated and measured in controlled studies, making it one of the more reliable datasets available for road effects. These studies have found that noise affects GRSG abundance, stress levels, and behavior (Patricelli et al. 2013). Blickley et al. (2012a) manipulated noise levels using speakers at leks and found a 73% decline in male lek attendance with traffic noise treatment (mean noise level of 43.2 A-weighted decibels [dBA]), as well as elevated cortisol levels in fecal samples that indicate physiological stress. Cortisol levels remained elevated in both the second and third years of the study, suggesting that GRSG do not adapt to increased noise levels over time (Blickley et al. 2012b). Observations of changes to male behavior on the lek, including males altering timing of vocalizations to brief quiet periods, suggest that ambient noise may have a masking effect on the mating displays that could reduce reproductive success (Blickley 2012). Patricelli et al. (2013) calculated that noise from a road used by large vehicles (i.e., flatbed trucks and big rigs) will exceed an ambient noise level of 20 dBA by 10 dBA for 1.3 km and will be audible above ambient for at least 2.7 km with each passing vehicle. For an ambient noise level of 16 dBA, they calculated that vehicle noise will exceed 10 dBA above ambient out to 1.7 km from the road. Patricelli et al. (2013) note that the 10-dB threshold is used commonly inside and outside of Wyoming core areas and in other states, although it is not yet known whether this threshold is sufficient to protect GRSG during mating, nesting, and brood rearing.

Relatively few studies have been conducted on the indirect effects of pipelines on GRSG distribution. Where the effects of pipelines have been considered, the results are inconclusive because the pipelines are included as one factor in a long list of potential explanatory variables, many of which have confounding effects (e.g., Johnson et al. 2011; Knick et al. 2013). During pipeline construction, traffic and human presence are similar to that of a moderate-traffic road and can be modeled using the same approach during construction. Patricelli et al. (2013) note that many types of anthropogenic noise are similar and are likely to elicit a similar adverse response by GRSG.

For the HEA, habitats located within 250 m of a high-traffic road (greater than 6,000 annual average daily traffic [AADT]⁸), such as an interstate highway or high-traffic federal or state highway, a mainline railroad, or an urban area, are considered to provide no functional habitat to GRSG because of traffic and associated noise and human disturbance (Table 7, Figure 5). Likewise, habitats within 25 m of a moderate-traffic road (a low-traffic federal or state highway, for example), spur railroad, mine footprint, operational well pad, or pipeline under construction are considered to provide no functional habitat (Figure 6). Habitats within these buffers are adjusted by a factor of 0 for a final functional habitat score of 0. Those habitats located farther than 500 m and 3,200 m, respectively, of a moderate-traffic road or a high-traffic road were considered the most serviceable to GRSG and were assigned a score adjustment factor of 1.0. No adjustment will be made for two-track roads or other roads with a dirt surface.

While the application of score adjustment factors is not perfectly supported in the peer-reviewed literature, the approach used for the model places a larger adjustment on habitats that are bisected by all types of large roadways, mainline railways, and urban areas. Adjustments are higher for facilities that typically have higher traffic levels and risks to GRSG (e.g., mortality from collision and noise disturbance) than less-utilized facilities that generally have less traffic and fewer implied risks.

⁸ This cutoff was determined by examining the AADT of roads and identifying natural break points occurring between interstate highways, major federal and state highways, and other road types.

A moderate-traffic road score adjustment factor will also be applied around Project footprints for the duration of active construction of other project types to account for increased traffic, disturbance, and human presence on the landscape.

Table 7. Score Adjustment Factor for Proximity to Road, Mainline Railway, or Urban Area

Road Size Categories	Score Adjustment Factor				
	1.0	0.75	0.50	0.25	0
Distance to high-traffic road (greater than 6,000 AADT), urban area, or mainline rail (m).	>3,200	1,600–3,200	1,000–1,600	250–1,000	<250
Distance to moderate-traffic road (e.g., county roads and low-traffic highways), spur rail, operating well pad, or similar disturbance type (m). Does not include two-track roads. Distance to pipeline and other project types during year(s) of construction.	>500	300–500	100–300	25–100	<25

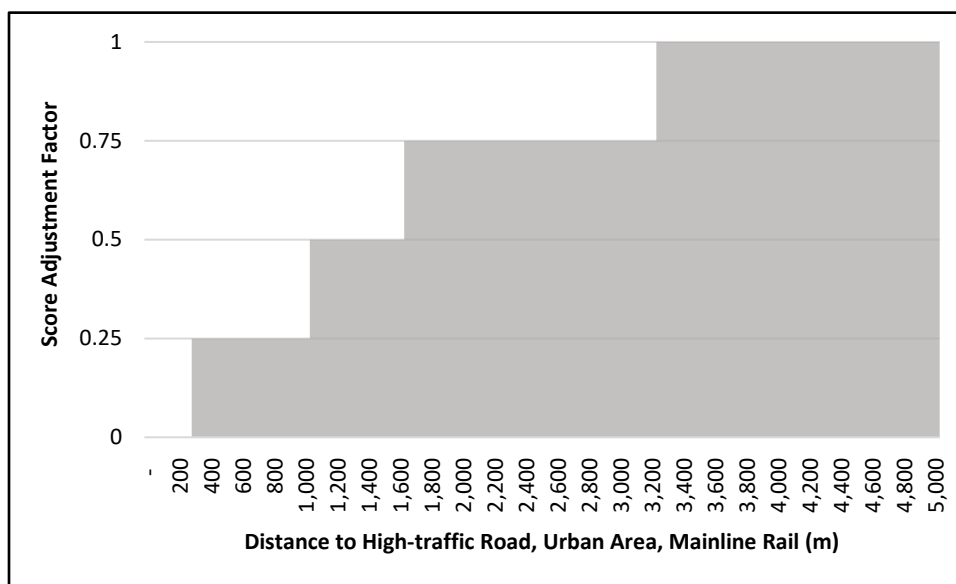


Figure 5. Adjustment of scores for proximity to a high-traffic road, urban area, or mainline rail.

While the application of score adjustment factors is not perfectly supported in the peer-reviewed literature, the approach used for the model places a larger adjustment on habitats that are bisected by all types of large roadways, mainline railways, and urban areas. Adjustments are higher for facilities that typically have higher traffic levels and risks to GRSG (e.g., mortality from collision and noise disturbance) than less-utilized facilities that generally have less traffic and fewer implied risks.

A moderate-traffic road score adjustment factor will also be applied around Project footprints for the duration of active construction of other project types to account for increased traffic, disturbance, and human presence on the landscape.

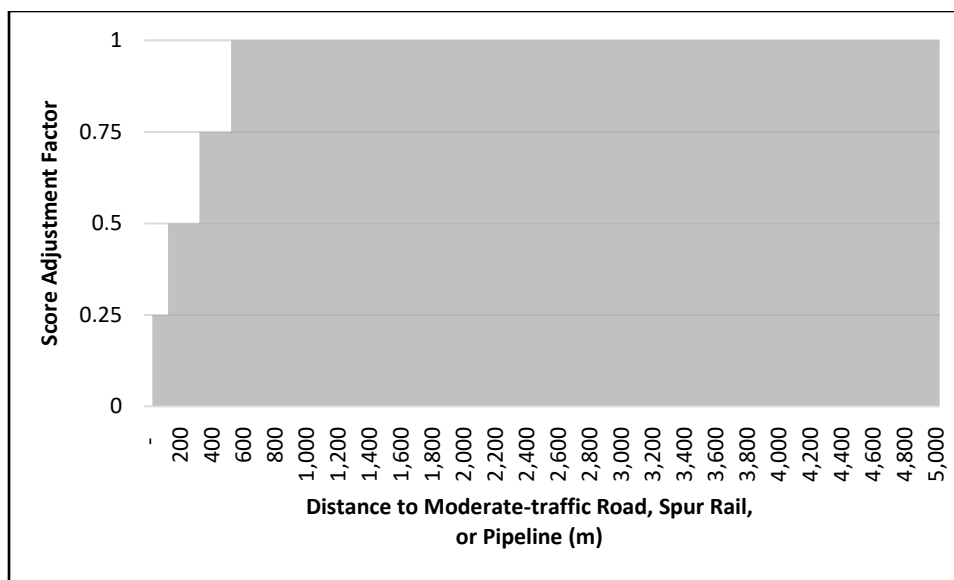


Figure 6. Adjustment of scores for proximity to a moderate-traffic road, spur rail, well pad, or other infrastructure with similar traffic loads.

3.2.2.5 COMPRESSORS, TERMINALS, ACTIVE MINES, AND SIMILAR NOISE SOURCES

The noise produced by compressor stations or terminals has the potential to locally decrease GRSG habitat use. While the effects of compressor stations have not been specifically studied, this noise type (point source) and level may be comparable to that of a natural gas drilling rig. Blickley et al. (2012) recorded noise from natural gas drilling rigs (continuous noise less than 2 kHz) and played the recordings at leks in Fremont County, Wyoming, at a volume that simulated a 400-m distance from the noise source. Compared to experimental controls, a 29% decrease in attendance occurred over three breeding seasons. The effect of the noise was immediate and sustained, having the potential to affect the size and persistence of the local population, although lek attendance rebounded the year after the treatment ended.

The model assumes an effect that is similar in magnitude to that measured by Blickley et al. (2012) for drilling rigs on lek attendance and that is greatest close to the source and attenuates with distance (Table 8, Figure 7). Within 50 m of the compressor station, 75% of habitat value is lost (i.e., 0.25 adjustment factor). This value returns over a distance of 450 m; beyond 450 m, there is no decrease in habitat value.

The effects of noise production (and, conversely, noise mitigation techniques) have the potential to vary greatly by source, type, and location. This variable may be changed to better represent this variability in the future as required to maintain consistency with the best available science.

Table 8. Score Adjustment Factor for Proximity to Compressors, Terminals, Active Mine Footprints, and Other Noise Sources

Distance (m)	Adjustment Factor
0–50	0.25
50–100	0.50
100–450	0.70
>450	1.00

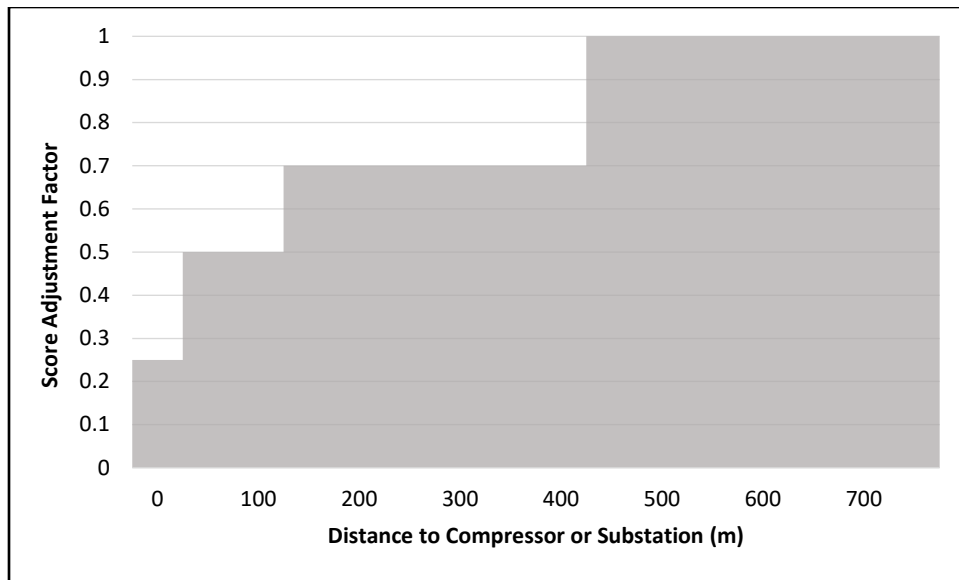


Figure 7. Adjustment of scores for proximity to compressors, terminals, active mine footprints, and other noise sources.

3.2.2.6 WIND FACILITIES

LeBeau (2012) detected no decrease in habitat use with proximity to turbines by hens in the nesting, brood-rearing, or summer seasons in southern Wyoming. Although there was no effect to hen survival, LeBeau (2012) detected a decreased probability of nest and brood survival with proximity to turbine out to approximately 5 km and speculated that the effect may be attributed to increased predation resulting from the presence of human development and edge effects. In the same study area, LeBeau et al. (2017) determined that the percent area disturbed by wind facility infrastructure is a stronger predictor than distance to turbine. This pattern suggests that use in some seasons occurs around the edge of the facility and in less densely developed areas but also that use occurs less so within the facility. The relative probability of GRSG selecting brood-rearing and summer habitats decreased as the percentage of surface disturbance associated with the facility infrastructure increased out to approximately 1.2 km, and this relationship strengthened after a 3-year lag time. Wind facility disturbance in their study area ranged from 0 to 2.7%; a 2% disturbance resulted in a 60% reduction in the probability of habitat use. The percentage of surface disturbed did not affect selection of nest sites nor survival of hens, nests, or brood (LeBeau et al. 2017).

Because of the limited scientific research on the effects of wind energy, a conservative approach was used to develop scores for this habitat modifier variable. The percentage of the surface disturbed by wind energy facilities within 1.5 km will be used to determine scores following the results described in LeBeau et al. (2017). A 60% reduction in habitat function (score = 0.4) will be applied during the brood rearing season when wind energy infrastructure disturbs 2% to 3% of the area in a 1.5-km moving window (LeBeau et al. 2017). Remaining scores were determined by fitting a logarithmic curve centered on the 60% reduction value at 2% (Figure 8).

Because the impact described in LeBeau et al. (2017) applied only to brood-rearing habitat (approximately 25% of the year), the habitat scores were adjusted to reflect the seasonal nature of the impact. A 60% reduction in habitat services over 25% of a year is the equivalent of a 15% reduction in habitat services over an entire year. The values presented in Figure 8 were adjusted to reflect the seasonality of the impact, and final modifier values for wind energy impacts are presented in Table 9.

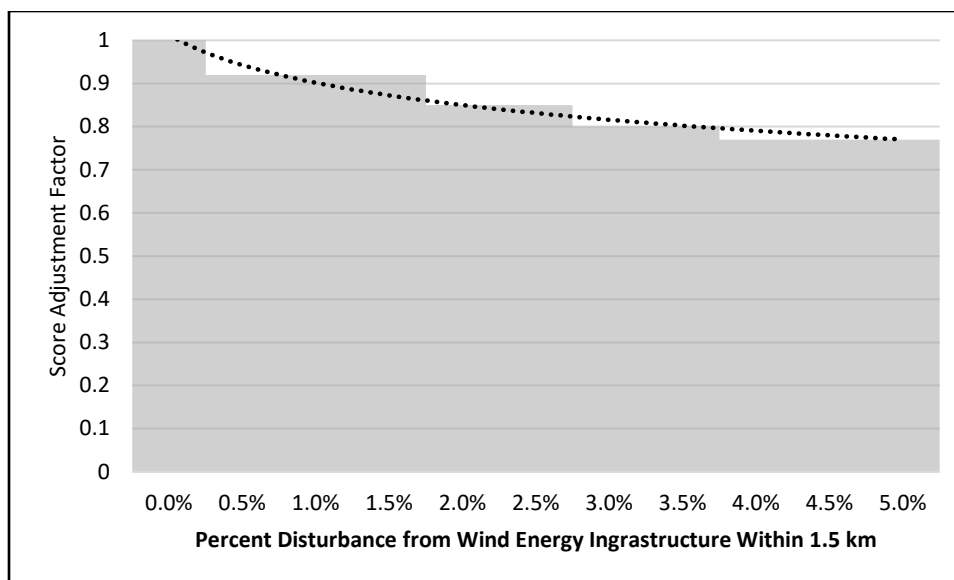


Figure 8. Adjustment of scores for the area covered by wind energy facilities. The line is a logarithmic curve used to develop scores for this habitat adjustment factor.

Table 9. Score Adjustment Factor for the Area Covered by Wind Energy Facilities

Percent Disturbance from Wind Energy Infrastructure within 1.5 km	Score
0.0%–<0.5%	1.00
0.5%–<2.0%	0.92
2.0%–<3.0%	0.85
3.0%–<4.0%	0.80
>4.0%	0.77

3.2.2.7 OTHER IMPACT TYPES

Additional anthropogenic features that are likely to have an indirect effect on GRSG survival or habitat use, but for which the effect is not well defined, are included in this section. These features include, but are not limited to, communications towers, houses, and distribution lines. Specific approaches for applying habitat score adjustment factors have not been developed for these impact types.

In addition to being a source of anthropogenic disturbance that fragments or eliminates habitat, communications towers provide perch and nesting structures for raptors and corvids, which potentially increases the predation pressure on GRSG in the areas surrounding structures (Dinkins et al. 2014b). In their survey of lek locations throughout the western half the species' range, Knick et al. (2013) found that high-value habitats had less than 0.01 towers/km², and lower-value habitats had greater than 0.08 towers/km² within a 5-km radius. Communications towers themselves were not a significant predictor of hen summer survival but increased site-specific exposure to raptors (specifically golden eagles [*Aquila chrysaetos*] in flatter habitats) was a significant predictor (Dinkins et al. 2014b).

The effect of rural houses has been considered (e.g., Dinkins et al. 2014a, 2014b). House density did not significantly affect mortality risk for GRSG hens (Dinkins et al. 2014b). However, the odds of habitat selection by hens increases with distance from rural homes out to 1.0 km in the early brood rearing season (odds ratio 8.67) and late brood-rearing season (odds ratio 12.94) (Dinkins et al. 2014a).

Although some limited research has been conducted on these types of impacts, the results of those studies do not allow for development of quantitative impacts models that can be used within the model. Until additional information is available to develop quantitative models, anthropogenic features with unknown impact types will be modeled using the moderate-traffic road score adjustment factor unless otherwise determined and supported by available scientific information.

3.3 Metric Score: Product of Natural and Built Environmental Scores

The HEA model for the Project uses measures of habitat services to quantify the functionality of habitat for GRSG. Habitat services are calculated in a geospatial platform at a 30-m pixel resolution (30- × 30-m raster cell, 900 m²). The natural environment and built environment scores are determined for each 30-m pixel, and the HEA baseline habitat service score (V_p) for that cell is calculated using the product of the natural environment and built environment layers (see Equation 3).

Equation 3

$$V_p = [(Natural\ Environment\ Score_p) \times (Built\ Environment\ Score_p)],$$

where p is the 30-m pixel in which the habitat service score is being calculated in the HEA geospatial platform.

After habitat service scores have been calculated for each pixel in the assessment area, the total habitat services in the assessment area (VJ) are calculated as the sum of the services provided in each pixel of the assessment area and expressed in service-acres (see Equation 4). The assessment area is defined as polygons of BLM-administered priority habitat management areas (PHMAs) and general habitat management areas (GHMAs) for GRSG that are intersected by the Project footprint out to 10 km from the Project centerline.

Equation 4

$$VJ = \sum_1^n V_p * J,$$

where V_p is the habitat score for the 30-m pixel, J is the area of the pixel in acres (0.2224 acres), and where n is the total number of 30-m pixels in the assessment area.

The total number of habitat services in the assessment area at baseline is the value from which habitat service losses resulting from the Project will be measured. The total number of habitat services in the assessment during construction, reclamation, and operations will be calculated and summed over the life of the Project to quantify the number of habitat services lost (expressed in service-acre-years). Appendices B-3 through B-6 illustrate the baseline, construction, restoration, and recovery habitat conditions in the assessment area using the natural environment and built environment metrics described in this document.

4 QUANTIFICATION OF PROJECT IMPACTS

The following sections describe the modeled losses of habitat services (direct and indirect impacts) resulting from Project construction and operation. These changes in the habitat service level were simulated in a geographic information system (GIS) platform to produce data inputs for the HEA.

Per the mitigation plan, TransWest will achieve the standard of a net conservation gain to GRSG habitat by employing a mitigation approach that produces more credit than debit, measured in DSAYs. The HEA is used to scale and quantify the level of mitigation (credit) needed to offset Project impacts (debit) to achieve no net loss (1:1 replacement). Impacts include 1) direct impacts resulting from Project construction in PHMAs and GHMAs, and 2) indirect impacts resulting from Project construction and operation in PHMAs and GHMAs. TransWest's approach to achieving net conservation gain above this 1:1 replacement level is described in the mitigation plan. TransWest has been issued a 30-year ROW grant for the TWE Project, subject to renewal (BLM 2017). If renewed, TransWest understands that the ROW grant would be subject to the regulations existing at the time of renewal and any other terms and conditions that the authorized officer deems necessary to protect the public interest. Upon expiration of the ROW grant, TransWest intends to apply for a ROW grant renewal as transmission facilities typically remain in use beyond 30 years with some transmission facilities remaining in service well in excess of 50 years. However, for the purposes of calculation of compensatory mitigation required during the initial term of the ROW grant, the HEA model assumes that the structures are dismantled and removed from the landscape so that the calculation of habitat services lost (debits) is limited to effects of Project construction and operation during the initial ROW grant term although the recovery of vegetation that was disturbed during construction is modeled through 102 years. If BLM should authorize a renewal of the ROW grant upon expiration of the initial term, then TransWest assumes that any necessary compensatory mitigation for GRSG and its habitat will be addressed in such ROW grant renewal.

4.1 Project Impacts at Project Milestones

Snapshots of the changing habitat services over time were modeled using GIS-based tools for each of the milestones identified above for incorporation into the HEA. The HEA calculated the total interim and permanent habitat injuries over the lifetime of the Project.

The following Project milestones were modeled for the HEA:

- **Baseline:** The baseline milestone quantifies habitat services available to greater GRSG before Project disturbance while accounting for existing disturbances⁹.
- **Construction:** The construction milestone quantifies habitat services available to GRSG during the construction of the transmission line and ancillary facilities. The magnitude of the loss of habitat services during construction is dependent on proximity of the Project and the amount of new surface disturbance.
- **Restoration:** The restoration milestone quantifies habitat services available to greater GRSG after the Project construction is complete and some services return with the reduction in construction noise and human presence.
- **Recovery:** Seven recovery milestones quantify habitat services available to greater GRSG after a vegetation type has recovered to the greatest extent expected after Project restoration is complete. Habitat services return to baseline conditions in restored areas with the time to recovery depending on the vegetation type, up to 102 years.
- **ROW Term:** The ROW Term is modeled as ending after 30 years of Project operation. At this point, the indirect effects of Project operation are stopped, as if the transmission structures were

⁹ Existing transmission lines, including the co-located Gateway South Transmission Line, were included as existing disturbances.

dismantled and removed. Recovery of the Project's direct effects continue to be modeled beyond this milestone.

Ideally, the baseline habitat service level would account for all habitat service losses associated with existing environmental disturbances. This occurs to the extent possible with the existing data for the assessment area. In some cases, existing habitat disturbances were not mapped in the baseline service level because they were not detected by the chosen habitat services metric or because the data were unavailable for use in the baseline analysis. Omission of these disturbances is a conservative approach to the analysis of the Project-related habitat service losses. When baseline disturbances are omitted, the analysis assumes that the habitats affected by the Project are of higher quality than they actually are and thus require a greater amount of mitigation to offset the Project-related habitat service losses.

The habitat service losses were calculated based on the Project layout and construction schedule. The footprint of the Project was provided electronically by TransWest. The footprint files specify the anticipated locations of and direct disturbance associated with new and existing access roads, transmission towers, pulling/tensioning areas, terminals, and helicopter yards. The construction schedule provided for the Project indicates that construction would be completed in Year 1, active restoration would be completed in Year 2, and vegetation recovery would take up to 100 years, depending on disturbance and vegetation type. Vegetation-specific recovery times were determined for cleared, mowed, and drive and crush disturbance types (Appendix C). As a conservative approach to mitigation planning, this analysis assumes that all vegetation disturbance would be the cleared type, which requires the longest recovery time and results in the largest habitat service loss over time. Direct and indirect disturbances modeled are described by milestone and project year in Table 10 and Table 11, respectively.

In 11 miles of PHMA, self-supporting tubular steel monopoles are being installed on federally managed land to reduce raptor and raven perching and nesting opportunities where there is no existing above-ground transmission-related infrastructure. Where monopoles are used, the indirect transmission line impact associated with increased predation by raptors and ravens is modeled. Decreased population growth (0–10,000 m [10 km]) is not modeled, but the indirect transmission line impact associated with avoidance of tall structures (Avoidance (0–600 m [0.6 km]) is modeled. The impact associated with increased predation by nesting raptors and ravens is not modeled because the use of monopoles was implemented specifically to mitigate this impact.

Table 10. Direct Disturbance Levels Modeled by Project Year for New Disturbances

Project Milestones	Project Year	Percent Baseline Services Present at Each Milestone by Direct Disturbance Type*		
		Permanent Impact: Terminals	Permanent Impact: Transmission Line Structures (average 68.66 m ² of the pad [†])	Temporary Impacts: New and Existing Access Roads, Fly Yards, Transmission Towers (remainder of pad), Pulling/Tensioning Sites, Material Storage Yards, Ground Electrode Work Areas, and Elsewhere [‡]
Baseline	0	100%	100%	100%
Construction	1	0%	0%	0%
Restoration	2	0%	0%	0%
Recovery 1	3	0%	0%	100% of agricultural and wetland 20% of grassland and riparian 5% of shrub 1% of low sagebrush 1% of big sagebrush
Recovery 2	7	0%	0%	100% of agricultural and wetland 100% of grassland and riparian 25% of shrub 5% of low sagebrush 5% of big sagebrush
Recovery 3	12	0%	0%	100% of agricultural and wetland 100% of grassland and riparian 50% of shrub 10% of low sagebrush 10% of big sagebrush
Recovery 4	17	0%	0%	100% of agricultural and wetland 100% of grassland and riparian 75% of shrub 15% of low sagebrush 15% of big sagebrush
Recovery 5	22	0%	0%	100% of agricultural and wetland 100% of grassland and riparian 100% of shrub 20% of low sagebrush 20% of big sagebrush
ROW Term	32	0%	0%	100% of agricultural and wetland 100% of grassland and riparian 100% of shrub 30% of low sagebrush 30% of big sagebrush

Project Milestones	Project Year	Percent Baseline Services Present at Each Milestone by Direct Disturbance Type*		
		Permanent Impact: Terminals	Permanent Impact: Transmission Line Structures (average 68.66 m ² of the pad†)	Temporary Impacts: New and Existing Access Roads, Fly Yards, Transmission Towers (remainder of pad), Pulling/Tensioning Sites, Material Storage Yards, Ground Electrode Work Areas, and Elsewhere‡
Recovery 6	52	0%	0%	100% of agricultural and wetland 100% of grassland and riparian 100% of shrub 50% of low sagebrush 50% of big sagebrush
Recovery 7	102	0%	0%	100% of agricultural and wetland 100% of grassland and riparian 100% of shrub 100% of low sagebrush 100% of big sagebrush

* Vegetation-specific recovery times were determined for cleared, mowed, and drive and crush disturbance types (Appendix C). As a conservative approach to mitigation planning, this analysis assumes that all vegetation disturbance would be the cleared type, which requires the longest recovery time and results in the largest habitat service loss over time.

† *Tower pad* in this table refers to the permanent tower footprint. The average footprint size among structures was applied to the model for the permanent impact.

‡ *Elsewhere* refers to construction roads that were reduced to two-track roads or any areas where vegetation was cleared for Project construction that were subsequently revegetated during restoration (e.g., staging areas).

Table 11. Indirect Disturbance Levels Modeled by Project Year for New Disturbances

Project Milestones	Project Year	Indirect Disturbance Buffers Applied by Disturbance Type		
		Terminals	Transmission Line Structures	New and Existing Access Roads, Helicopter Pads, Transmission Towers (reclaimed area of pad), and Pulling/Tensioning Sites
Baseline	0	None	None	None
Construction	1	Active Construction Site*	Active Construction Site	Active Construction Site
Restoration	2	Terminal†	Transmission Line‡	None
Recovery 1	3	Terminal	Transmission Line	None
Recovery 2	7	Terminal	Transmission Line	None
Recovery 3	12	Terminal	Transmission Line	None
Recovery 4	17	Terminal	Transmission Line	None
Recovery 5	22	Terminal	Transmission Line	None
ROW Term	32	None	None	None
Recovery 6	52	None	None	None
Recovery 7	102	None	None	None

* *Active Construction Site* refers to the Roads, Railroads, Urban areas, Pipelines, and Active Construction Sites Anthropogenic Impact Type at the level of "Distance to moderate-traffic road (e.g., county roads and low-traffic highways), spur rail, operating well pad, or similar disturbance type (m). Does not include two-track roads. Distance to pipeline and other project types during year(s) of construction."

† *Terminal* refers to the Compressors, Terminals, Active Mines, and Similar Noise Sources anthropogenic impact type.

‡ *Transmission Line* refers to the Transmission Lines 115-kV and Larger anthropogenic impact type. Both Avoidance and Decreased Population habitat service losses were applied, except where monopoles are being installed to mitigate Decreased Population impacts.

4.2 Impacts Over the Full Analysis Period

The HEA model calculates the present value of future changes to the baseline habitat service level with time caused by losses of habitat services with Project development and gains of habitat services with mitigation projects. Economists call this process *discounting*, and it is a standard part of the HEA model. Discounting converts services being provided in different time periods into current time-period equivalents (Allen et al. 2005). Discounting results in a gradual increase in the service-acres provided by injured habitats over time (the habitat service loss is discounted) and a gradual decrease in service-acres gained by habitat conservation over time (the habitat service gain is discounted). Consequently, credit for mitigation in the form of habitat conservation is greater when implemented early in the lifetime of the Project than when implemented late in the lifetime of the Project. This encourages early mitigation to offset habitat service losses to ensure that long-term adverse effects to the resource are minimal. In theory, the discount rate applied reflects societal preferences and priorities for resource management. The discount rate applied to the habitat service losses was 3%, which is the most common discount rate applied in HEAs in the United States (Figure 9).

The approach described above produced a measure of habitat services (in service-acres) in the assessment area for each of the Project milestones. The HEA is a stepwise model that quantifies the habitat injury separately in each year (see Figure 9). Each of the milestones was assigned to a calendar year, as defined in the previous section. A linear change in habitat services was used to estimate annual service-acre increases between restoration and recovery and between the vegetation-specific recovery times. The total number of service-acres lost per year was adjusted by the discount rate, summed across the analysis period, and expressed as discounted (i.e., present-value) service-acre-years. This value (I) is the estimated sum of the interim and permanent losses to GRSG habitat that would occur because of Project construction, operation, and maintenance (Equation 5).

Equation 5

$$I = \sum_{t=1}^y (JV^j - JV^t) * \rho_t$$

where :

I is the present value of the service-acre-years lost over y years due to interim and permanent injury;

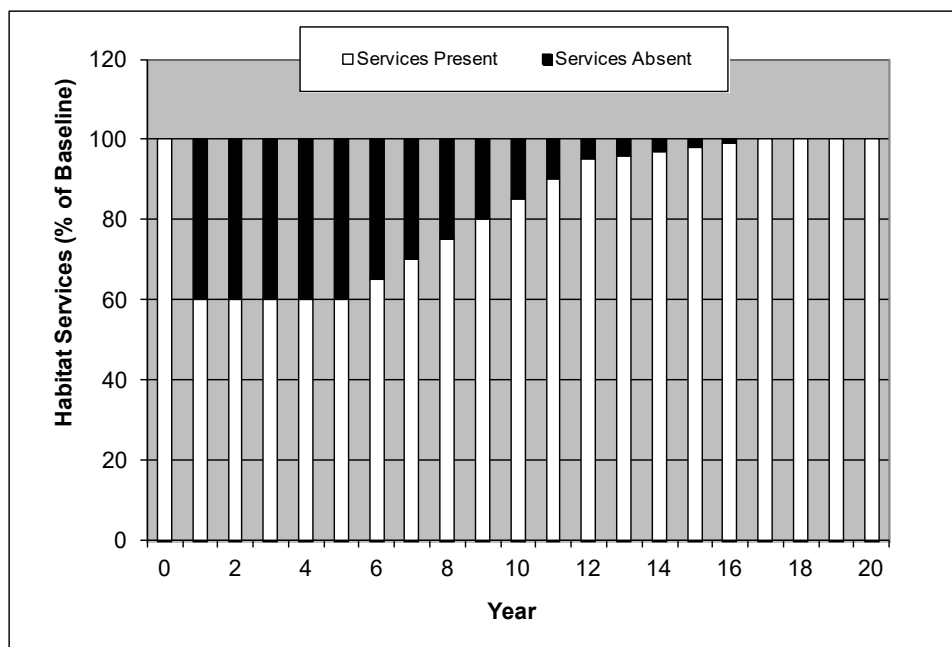
t is the project year, with $t=1$ being the year that Project construction begins;

y is the analysis period, in years (e.g., 102);

JV^j is the value of the habitat services provided by the injured habitat (service-acres) before injury (i.e., at the Baseline milestone);

JV^t is the value of the habitat services provided by the injured habitat (service-acres) in year t ; and

ρ_t is the discount factor, where $\rho_t = 1/(1+r)^{t-C}$, where r is the discount rate for the time period and C is the time the claim is presented ($C = \text{Project Year 1}$).



Note: Hypothetical example of how the HEA model considers habitat services absent and habitat services present in each year to calculate the total services lost over the Project period (i.e., the sum of the black bars).

Figure 9. HEA model calculation example.

5 QUANTIFICATION OF CONSERVATION BENEFIT TO HABITAT SERVICES

Mitigation projects are intended to create new or protect existing GRSG habitat services through the application of habitat restoration and conservation measures. TransWest presented a range of mitigation options in the Project FEIS, any of which could be applied to the Mitigation Plan. For this final Mitigation Plan, the mitigation was calculated for multiple project types including conservation easements and sagebrush restoration projects (including riparian enhancement and pinyon-juniper removal).

5.1 Mitigation Benefits at Mitigation Project Milestones

To inform the mitigation side of the HEA and calculate the number of acres required to offset Project impacts, the credit value of a mitigation project over time must be calculated in the currency of the HEA. Thus, the same habitat service metric that was applied to calculate Project impacts was applied to mitigation project types.

For conservation easements, the value of an acre was set to an average of 15.0 service acres per year. This service value was determined by calculating the median baseline habitat service value at previously documented GRSG locations in northeastern Colorado (see Section 3.2.2.2). This approach assumes that conservation easement sites would be established to conserve habitats currently used by GRSG. The tag relocation data are the most reliable indication of use available at the resolution of the model. The value of the credit over the lifetime of the Project was calculated in the same manner as for impacts over the same assessment period (102 years). The baseline value was set at 0.0 (no purchased credit), and the value of purchased credit (average habitat services per acre of 15.0) was maintained as constant across all Project milestones, simulating a term conservation easement.

For sagebrush restoration projects, habitat service gains were calculated as the difference between expected baseline habitat services for disturbed, recently burned, or unsuitable habitat (0 service acres per year) and median habitat services used by telemetered GRSG (15 service acres per year). For purposes of habitat service gains, it was assumed that the full benefit of sagebrush restoration would be realized within 75 years of treatment – the mid-point between full recovery of mowed habitat and cleared habitat. The mid-point was selected to reflect that enhanced restoration activities would be implemented (seedling planting, weed control, regular maintenance, etc.) versus the more passive activities assumed for cleared vegetation in Appendix C.

5.2 Mitigation Benefits Over the Lifetime of the Mitigation Project

The benefits in each year are discounted (with the standard 3% annual economic discount rate) and summed over the lifetime of the mitigation project. The benefits of the mitigation projects were quantified for 102 years, assuming purchase in the first year of construction and maintenance through the end of the analysis period.

The credit value (R) in present value service-acre-years is estimated as the sum of the interim and permanent gains to GRSG habitat that would occur because of establishing and maintaining the conservation credit site (Equation 6 [adapted from Equation 8.1 in Allen et al. 2005]).

Equation 6

$$R = \sum_{t=1}^y (PV^t - PV^p) * \rho_t$$

where:

R is the present value of the service-acre-years gained by mitigation measure (i.e., the conservation credit site);

$t = 1$ is the year the transmission line TWE Project begins;

y is the analysis period, in years (i.e., 102);

PV^p is the value provided by the habitat (service-acres) before the mitigation measure is implemented;

PV^t is the value provided by the habitat (service-acres) after the mitigation has been implemented in year t ; and

ρ_t is the discount factor, where $\rho_t = 1/(1+r)^{t-C}$, where r is the discount rate for the time period and C is the time the claim is presented ($C = \text{Project Year 1}$).

6 CALCULATION OF MITIGATION PROJECT SIZE

An HEA scales the size of the mitigation package (i.e., acres of conservation credit sites) to offset the loss of habitat services over the lifetime of the Project. The mitigation project size (P) can be solved by dividing the injury by the per-acre gain of the mitigation project (R^m , Equation 7).

Equation 7

$$P = I/R^m,$$

where:

I is the present value of the service-acre-years lost due to interim and permanent injury associated with the Project;

P is the size of the habitat restoration or mitigation project of type m (in units of acres or miles); and

R^m is mean service-years gained per acre of mitigation project

7 HABITAT EQUIVALENCY ANALYSIS RESULTS

The following sections describe the results of the HEA for habitat service losses over the lifetime of the Project and the results of the HEA for mitigation through conservation credit sites. These results are expressed in present value as the DSAYs lost or gained, which is the sum of the permanent and temporary losses and gains throughout the 102-year assessment period with the economic discount rate applied. These results were used to scale the size of mitigation project necessary to offset losses of habitat services 1:1.

7.1 Habitat Equivalency Analysis Habitat Service Loss Results

The modeled habitat service level at each of the Project milestones (Table 12) was entered into the HEA to calculate the present value of the habitat services lost through 2 years of construction and restoration, 30 years of project operation (ROW term), and 100 years of vegetation recovery. A summary of the estimated habitat service losses due to the Project's construction, operation, and maintenance is provided in Table 13 for the full assessment area (i.e., polygons of PHMAs and GHMAs that are intersected by the Project footprint out to 10 km from the Project centerline). These are the habitat service totals that need to be offset with mitigation.

Table 12. Undiscounted Habitat Services in the Analysis Area at Project Milestones (Input to HEA)

Project Milestone*	Project Year	Service-Acres in Analysis Area**
Baseline	0	5,313,162
Construction	1	5,249,826
Restoration	2	5,256,768
Recovery 1	3	5,256,875
Recovery 2	7	5,257,299
Recovery 3	12	5,257,738
Recovery 4	17	5,258,176
Recovery 5	22	5,258,614
Recovery 6 (ROW term)	32	5,309,005
Recovery 7	52	5,309,875
Recovery 9	102	5,312,050

* A linear rate of change is assumed between Project milestones.

** Polygons of PHMAs and GHMAs that are intersected by the Project footprint out to 10 km from the Project centerline

Table 13. Habitat Services Lost in the Assessment Area Over the 102-Year Assessment Period

Measure	Value
Total project length (km)*	123.5
Total project footprint in assessment area (acres)†	952.8
Assessment area (acres)‡	493,895.5
Habitat services in the assessment area at baseline condition (DSAYs)§	173,471,661.1
Habitat services lost in the assessment area (DSAYs)§	1,185,529.4

* Length of Project through assessment area in PHMAs and GHMAs

† Footprint of the Project inside PHMAs and GHMAs

‡ Polygons of PHMAs and GHMAs that are intersected by the Project footprint out to 10 km from the Project centerline

§ Summed over 102 years. Habitat services lost account for the impacts of construction, 30 years of Project operation under the current ROW grant, and gradual recovery of direct disturbances.

7.2 Habitat Equivalency Analysis Conservation Benefit Results

The modeled habitat service level at each of the Project milestones was entered into the HEA to calculate the present value of the habitat services gained over the lifetime of the mitigation project (102 years was assumed, simulating a term conservation easement). The estimated habitat service gain for a conservation easement site with an average value of 15.0 service acres per year over an assumed 102-year lifetime is 489.7 DSAYs per acre. The estimated habitat service gain for a sagebrush restoration project over an assumed 102-year lifetime is 229 DSAYs per acre.

7.3 Application of Results to a Mitigation Package

The mitigation requirements to offset Project impacts were calculated to accomplish a 1:1 trade-off in habitat service-acre-years over the lifetime of the Project per the ROD-requirements and HEA methods. TransWest has applied the HEA methods to identify how many of the 1,185,529.4 DSAYs lost would need to be replaced by a project mix of 80% DSAYs lost offset by conservation easement/acquisition, 20% offset by sagebrush restoration:

- 948,432.5 DSAYS offset by conservation easements/acquisitions
- 237,105.9 DSAYS offset by sagebrush habitat restoration

This project mix offsets habitat services lost at a 1:1 ratio and does not include TransWest's other mitigation commitments including net conservation gain.

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APPENDIX A

Vegetation Categorization for Habitat Equivalency Analysis Modeling

Vegetation and other landcover types were classified as either providing habitat for GRSG or not providing habitat for GRSG. Vegetation types providing no habitat services to GRSG (“Non-habitat” in Table A-1) were assumed to require no mitigation in the HEA. Those vegetation types that are used by GRSG (see “Habitat” in Table A-1) were assigned to one of five modeled vegetation categories. Each of the modeled vegetation categories had a different vegetation recovery time in the HEA model.

Vegetation and other landcover types were classified using multiple datasets to accurately characterize the existing landscape at a 30-meter pixel resolution. These were stitched together in ArcGIS.

- The Big Sagebrush, Low Sagebrush, and Shrub components of the National Land Cover Database (NLCD) 2016 data were used to classify big sagebrush, low sagebrush, and shrub cover (any cell with cover of 20% or greater is classified as the respective vegetation type). The Herbaceous Component of the NLCD 2016 data were used to classify herbaceous cover and bare earth (any cell with 80% cover or greater is classified as the respective layer).
- The Landfire Remap 2.0.0 data were used to classify conifer and hardwood vegetation cover (Existing Vegetation Type Physiognomy [EVT_PHYS] attribute).
- The National Agricultural Statistics Service (NASS) Cropland data were used to classify agricultural lands.
- The 2016 NLCD Landcover data were used to fill in vegetation type for where the other datasets above did not have data.

Table A-1. Vegetation Categorization Based on Multiple Data Sources

Vegetation Categories	Class Name	Data Source
Non-habitat: Anthropogenic Disturbance and Open Water	Developed/High Intensity	NLCD 2016 Landcover
	Developed/Low Intensity	NLCD 2016 Landcover
	Developed/Medium Intensity	NLCD 2016 Landcover
	Developed/Open Space	NLCD 2016 Landcover
	Barren Land	NLCD 2016 Landcover
	Open Water	NLCD 2016 Landcover
Non-habitat: Natural Vegetation	Deciduous Forest	Landfire (EVT_PHYS)
	Evergreen Forest	Landfire (EVT_PHYS)
	Mixed Forest	Landfire (EVT_PHYS)
Habitat: Agriculture and Wetland	Emergent Herbaceous Wetlands	NLCD 2016 Landcover
	Agriculture (various types of cultivated crops)	NASS Cropland Layer
	Hay/Pasture	NLCD 2016 Landcover
Habitat: Grassland and Riparian	Grassland/Herbaceous	NLCD 2016 Herbaceous Component
	Woody Wetlands	NLCD 2016 Landcover
Habitat: Shrub	Shrub/Scrub	NLCD 2016 Shrub Component
Habitat: Low Sagebrush	Low Sagebrush	NLCD 2016 Low Sagebrush Component
Habitat: Big Sagebrush	Big Sagebrush	NLCD 2016 Big Sagebrush Component

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APPENDIX B-1

Natural Environment Variables Maps

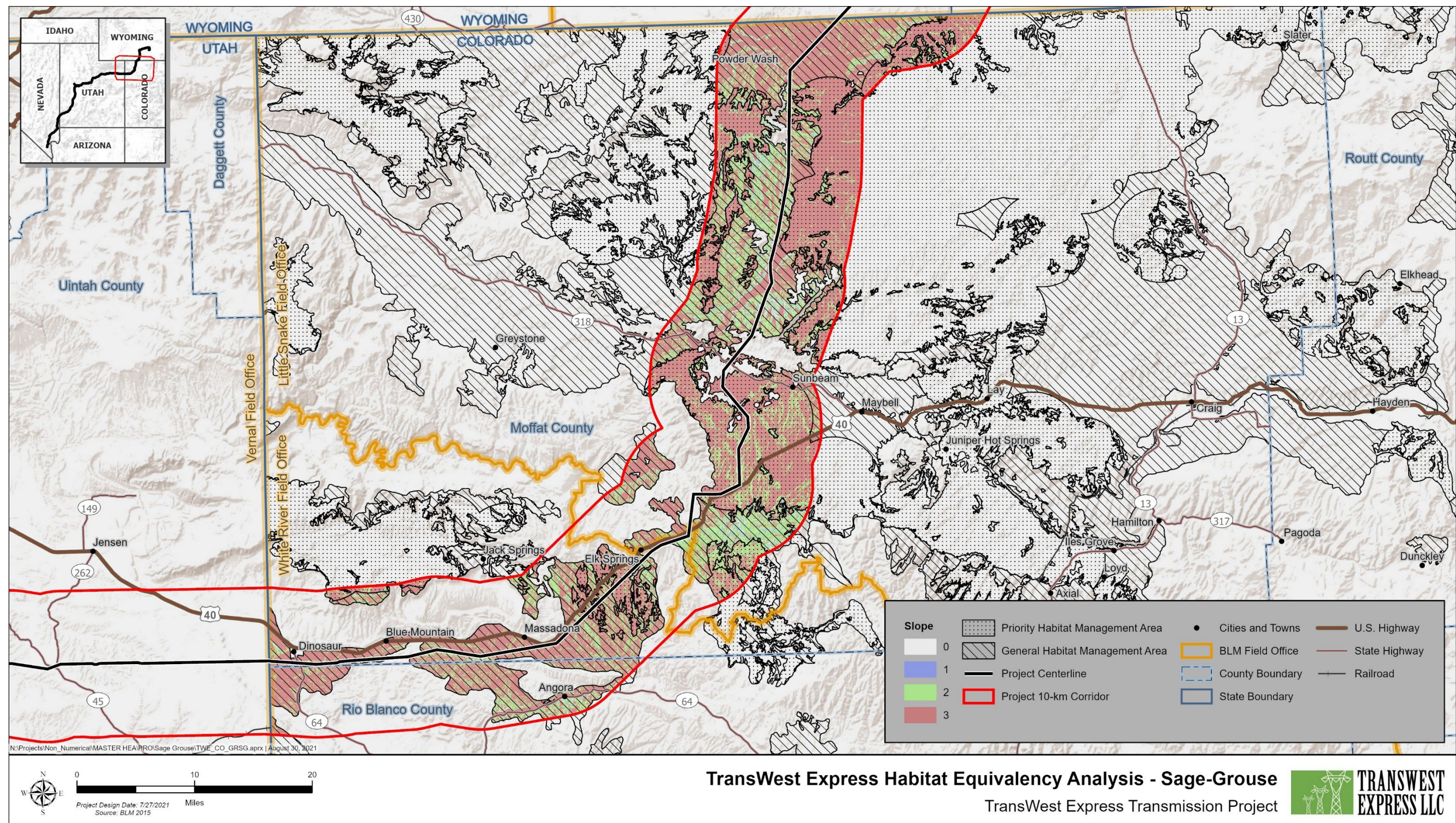


Figure B-1. Percent slope.

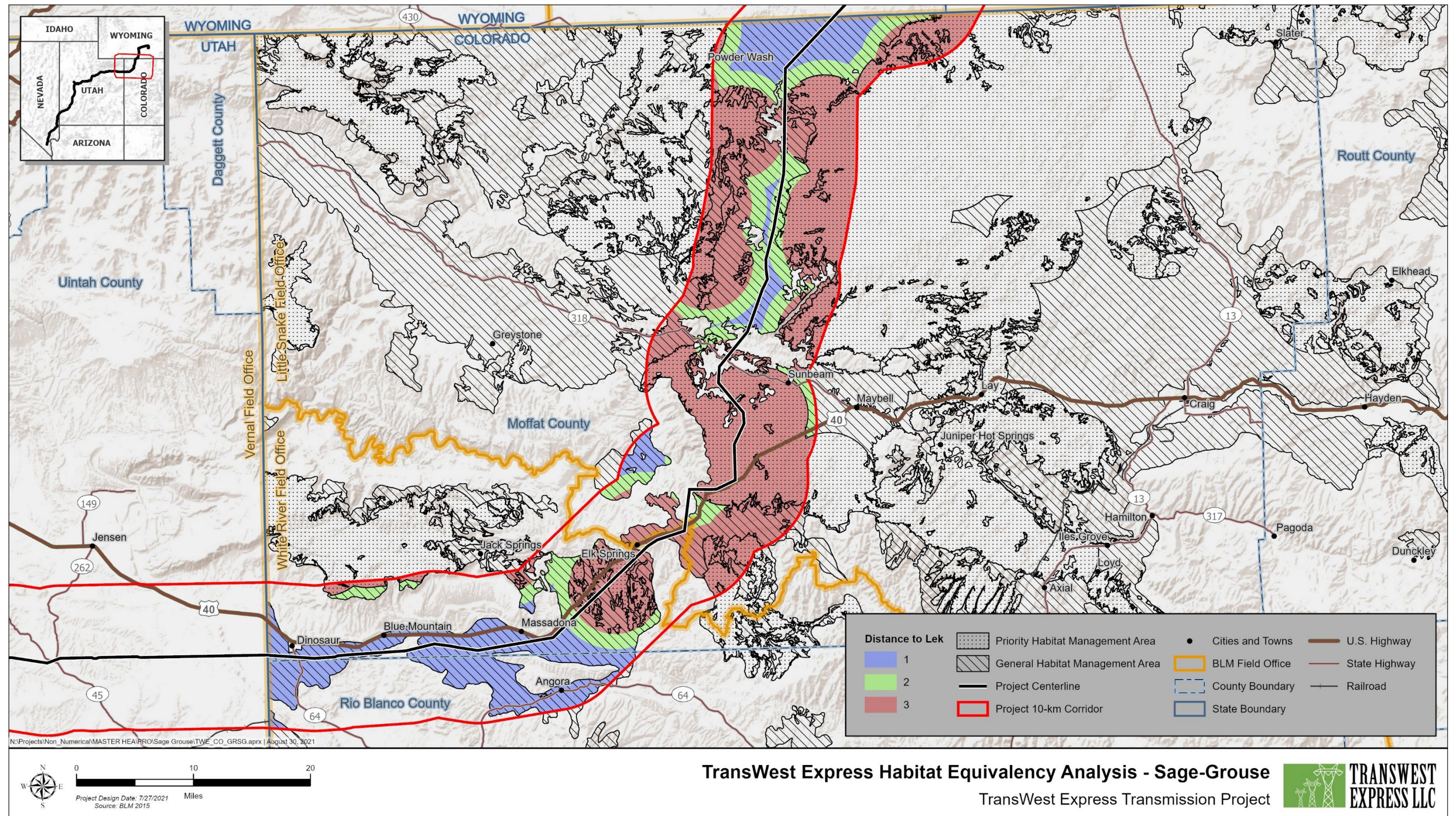


Figure B-2. Distance to lek.

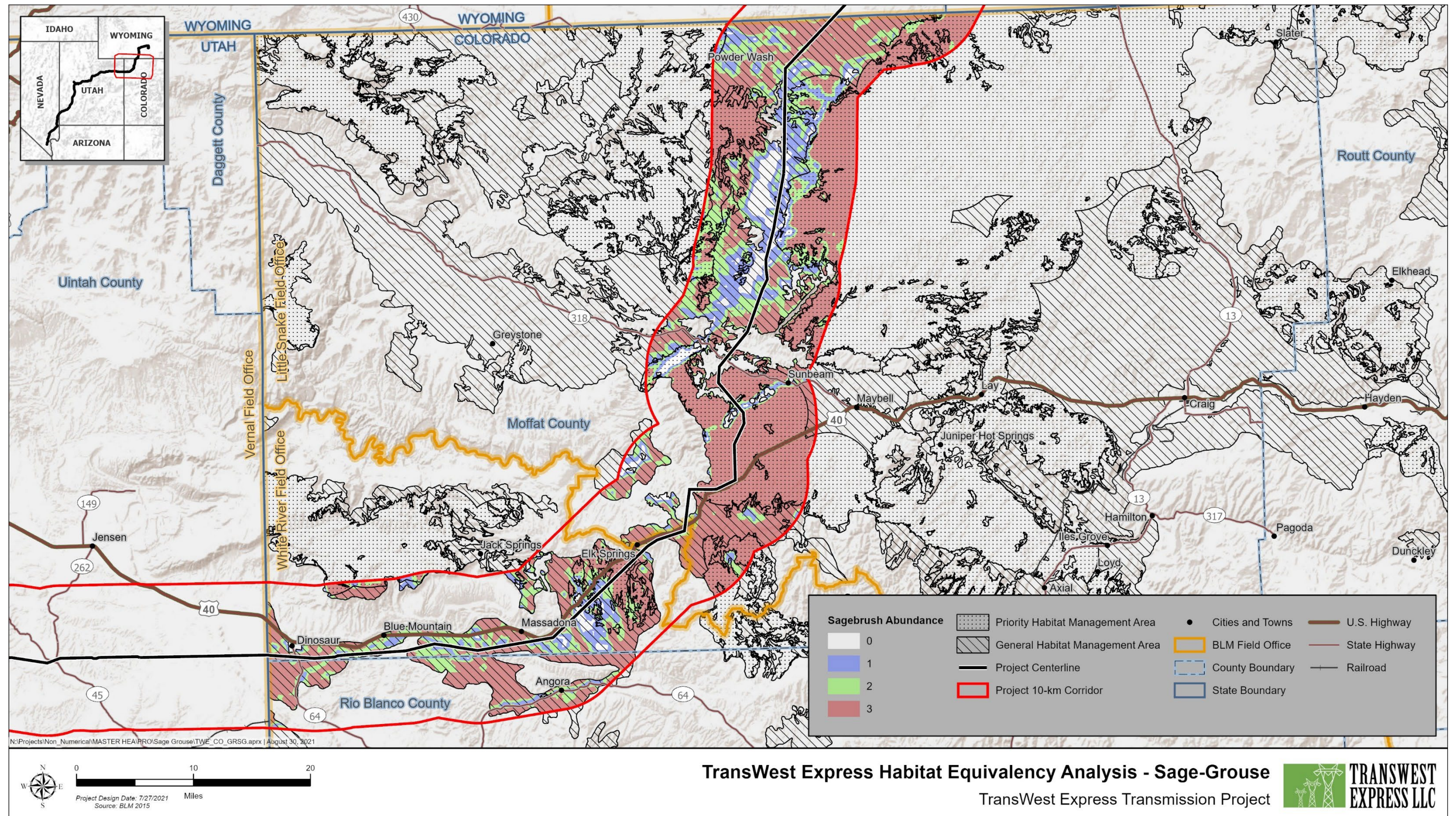


Figure B-3. Sagebrush abundance index.

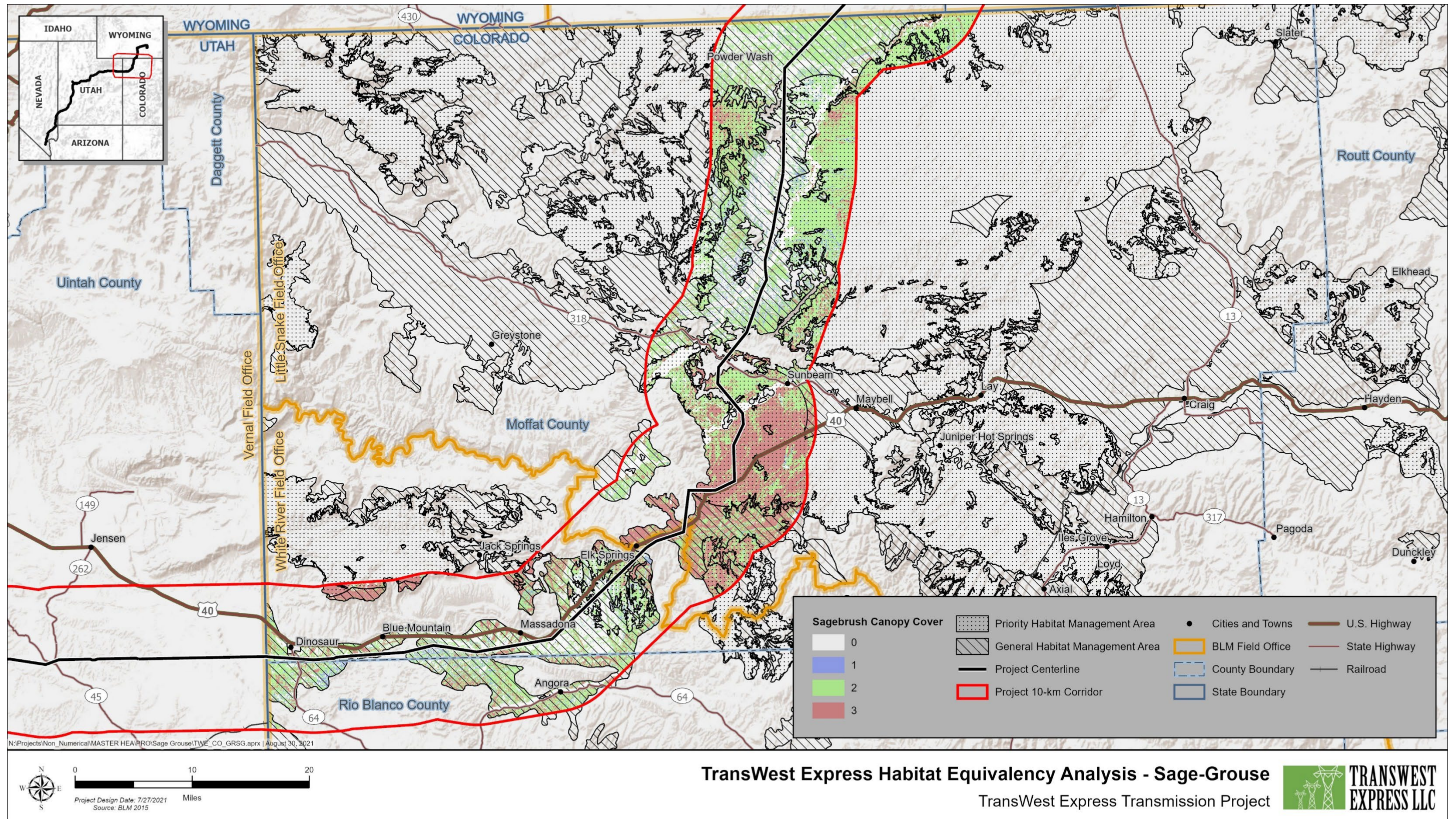


Figure B-4. Sagebrush canopy cover.

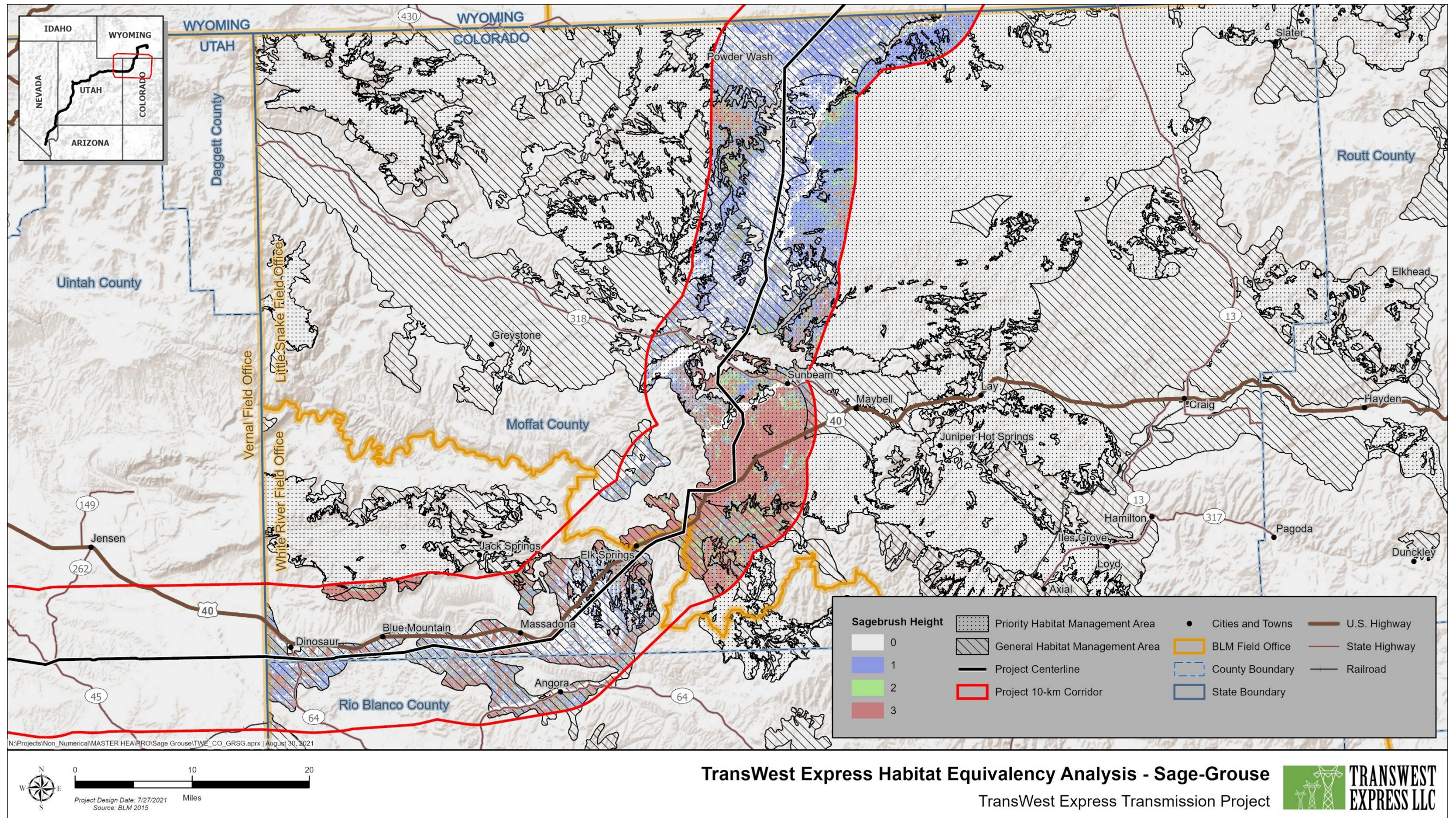


Figure B-5. Sagebrush canopy height.

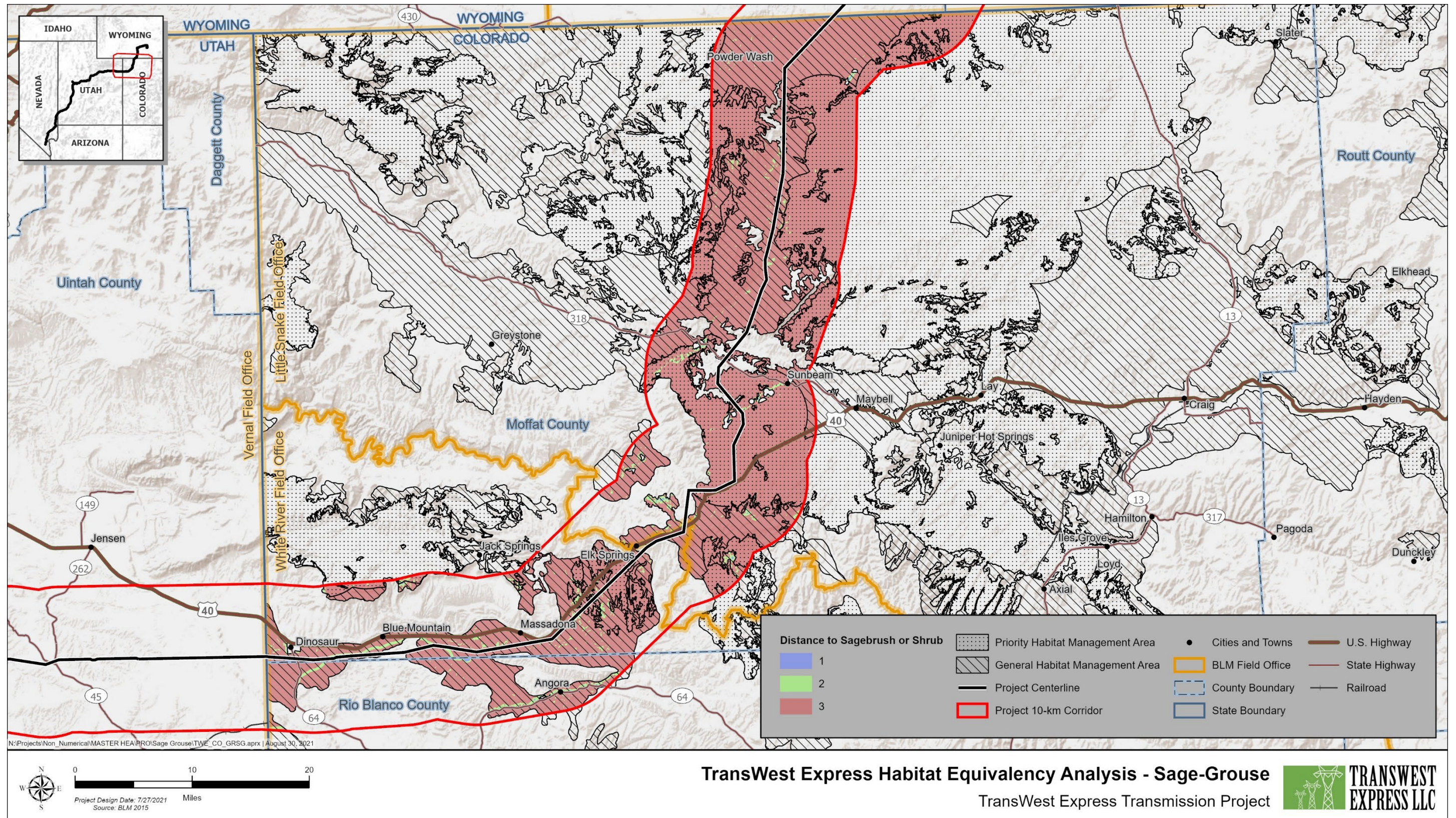


Figure B-6. Distance to vegetation dominated by sagebrush or shrub.

APPENDIX B-2

Built Environment Variables Maps

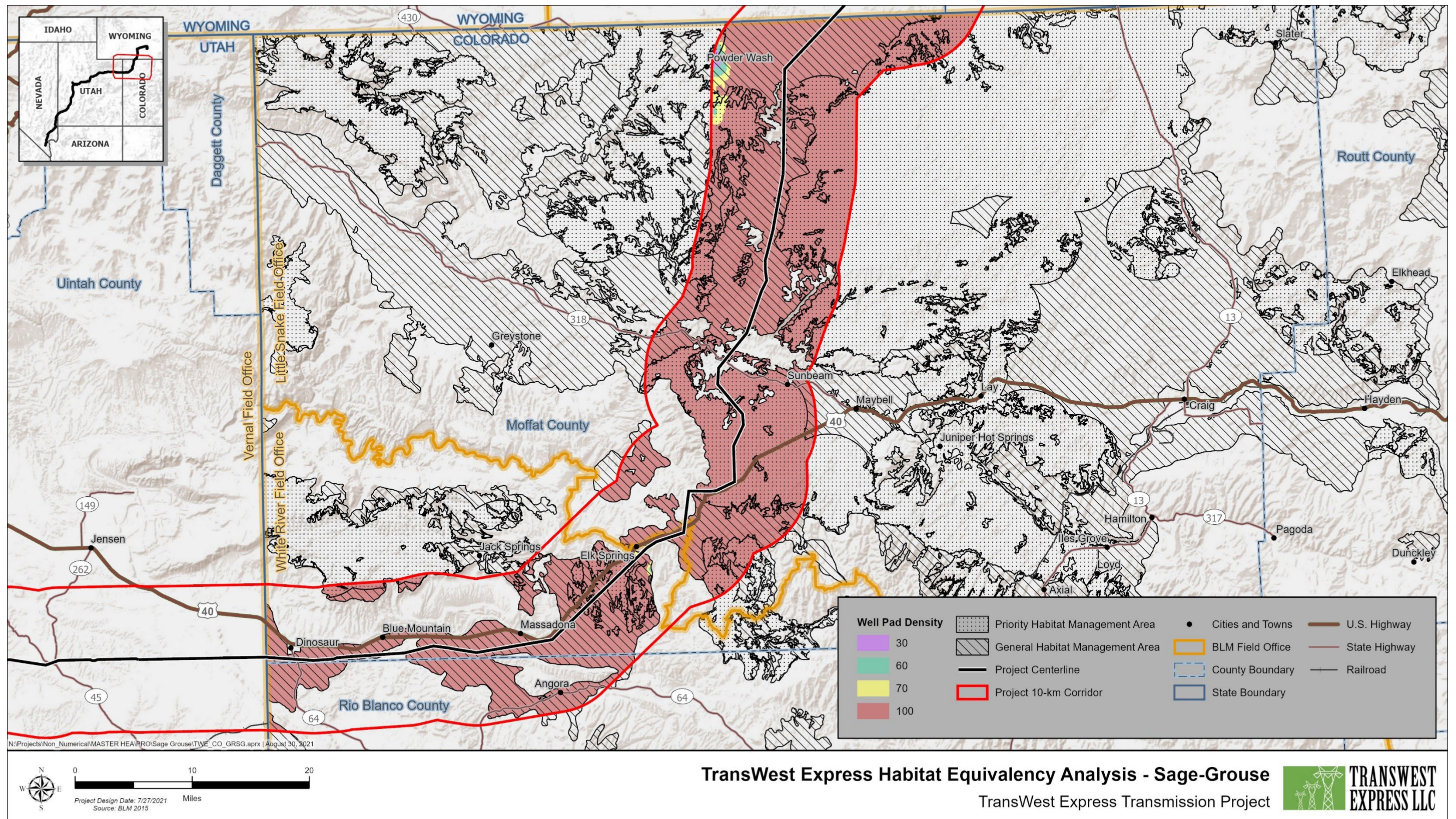


Figure B-7. Anthropogenic impact types: oil and gas well density.

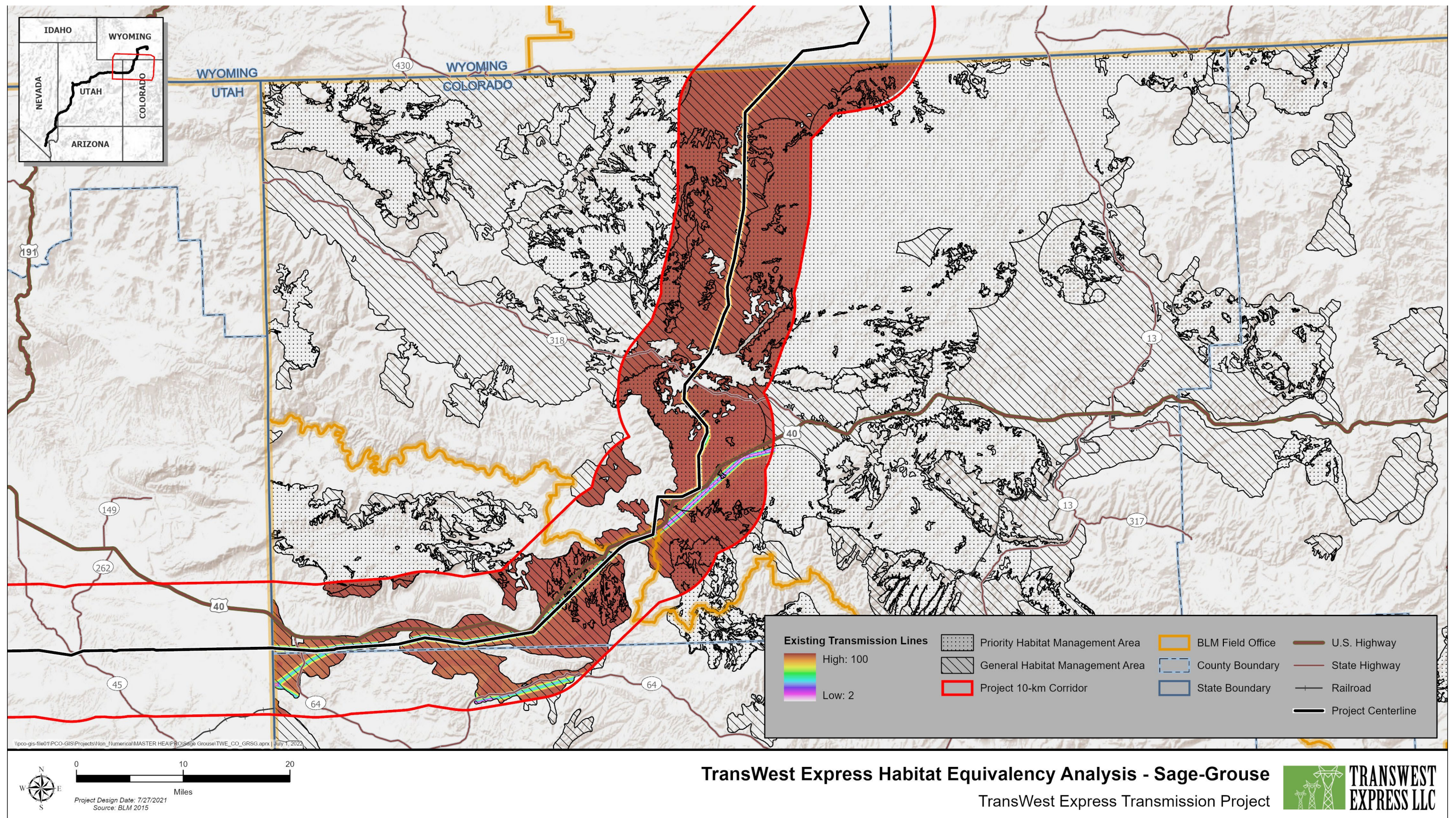


Figure B-8. Anthropogenic impact types: existing transmission lines 115-kV or larger.

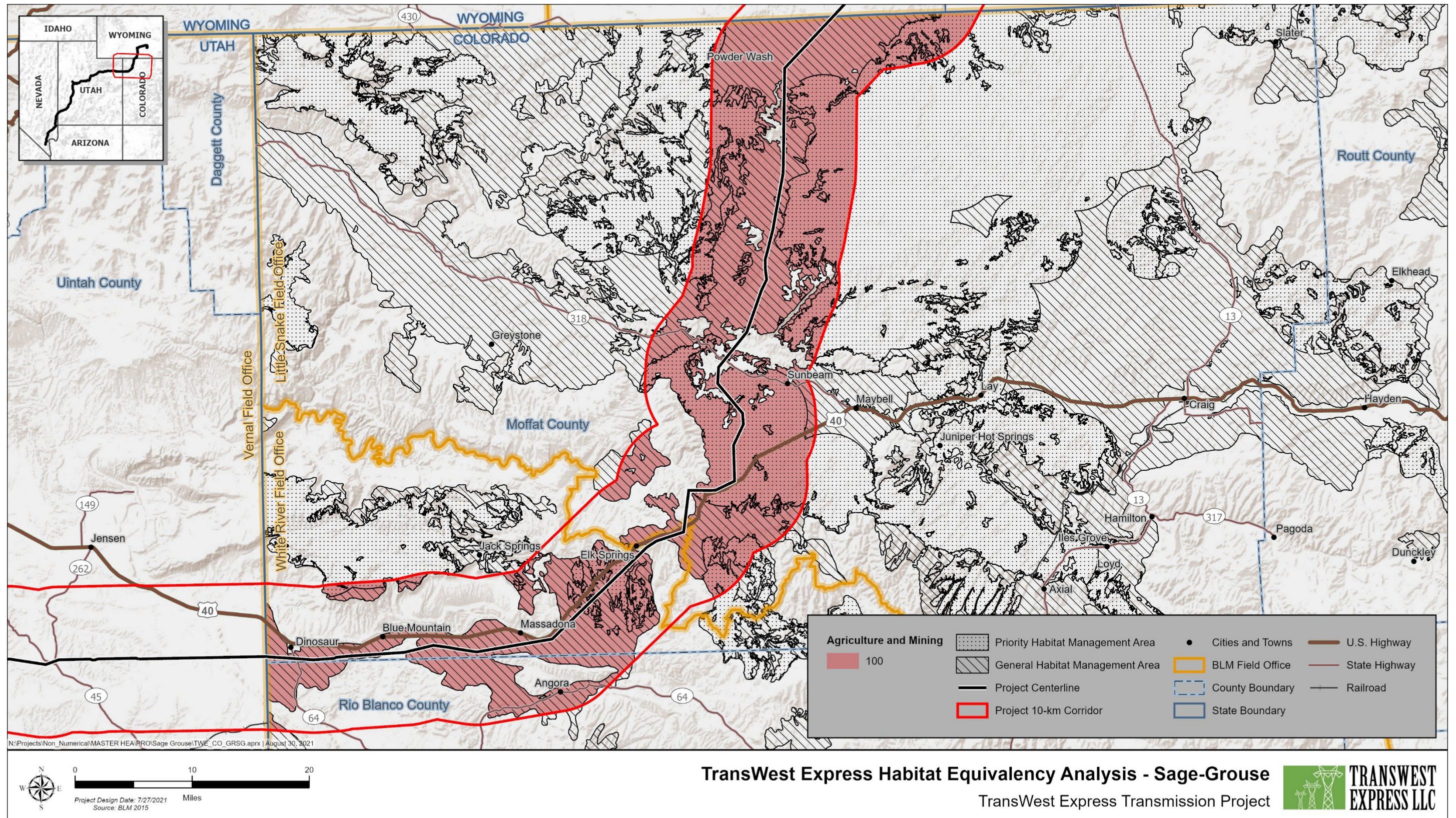


Figure B-9. Anthropogenic impact types: agriculture, mining, and other large-scale land conversion processes.

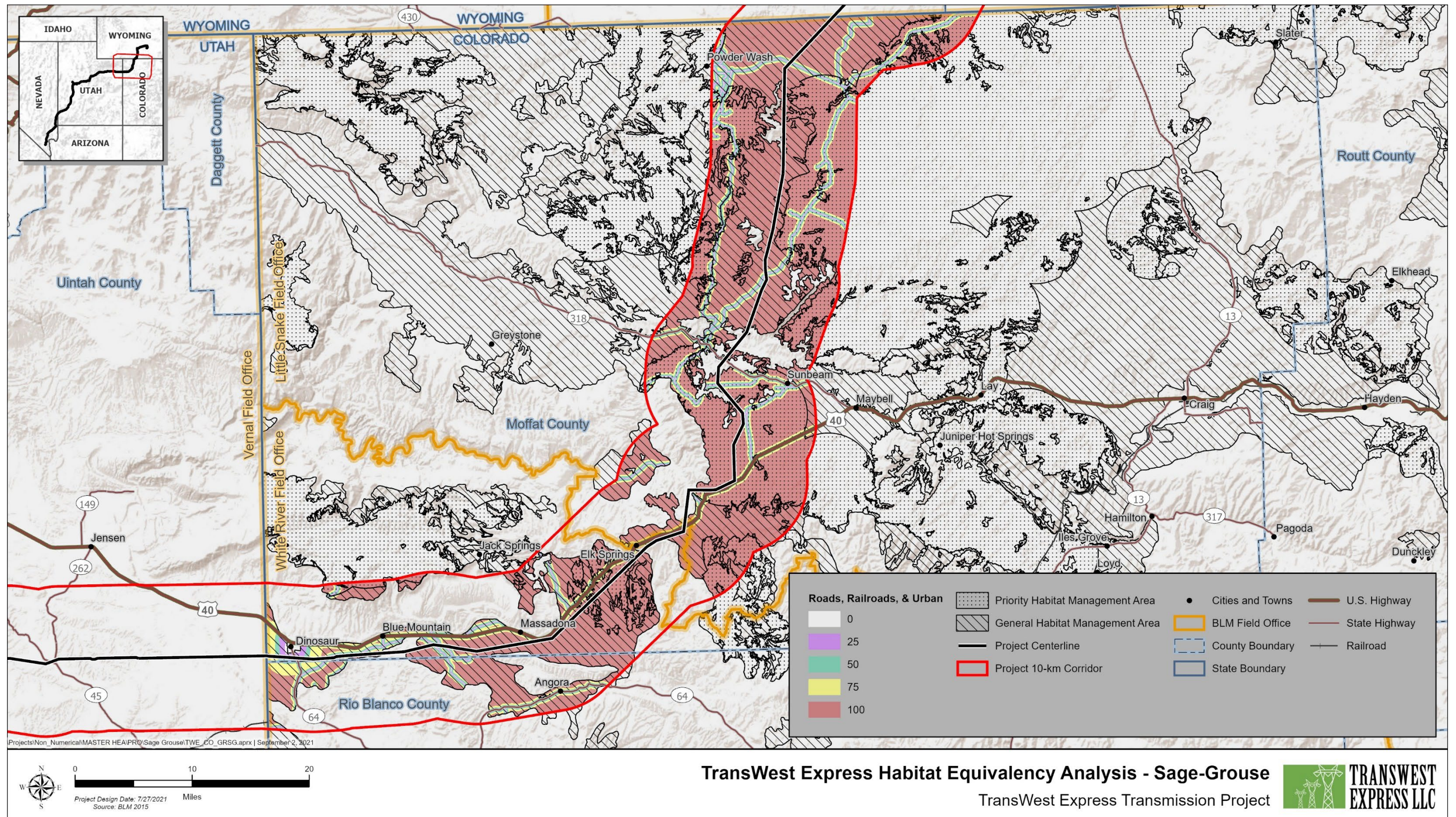


Figure B-10. Anthropogenic impact types: roads, railroads, urban areas, pipelines, and active construction sites.

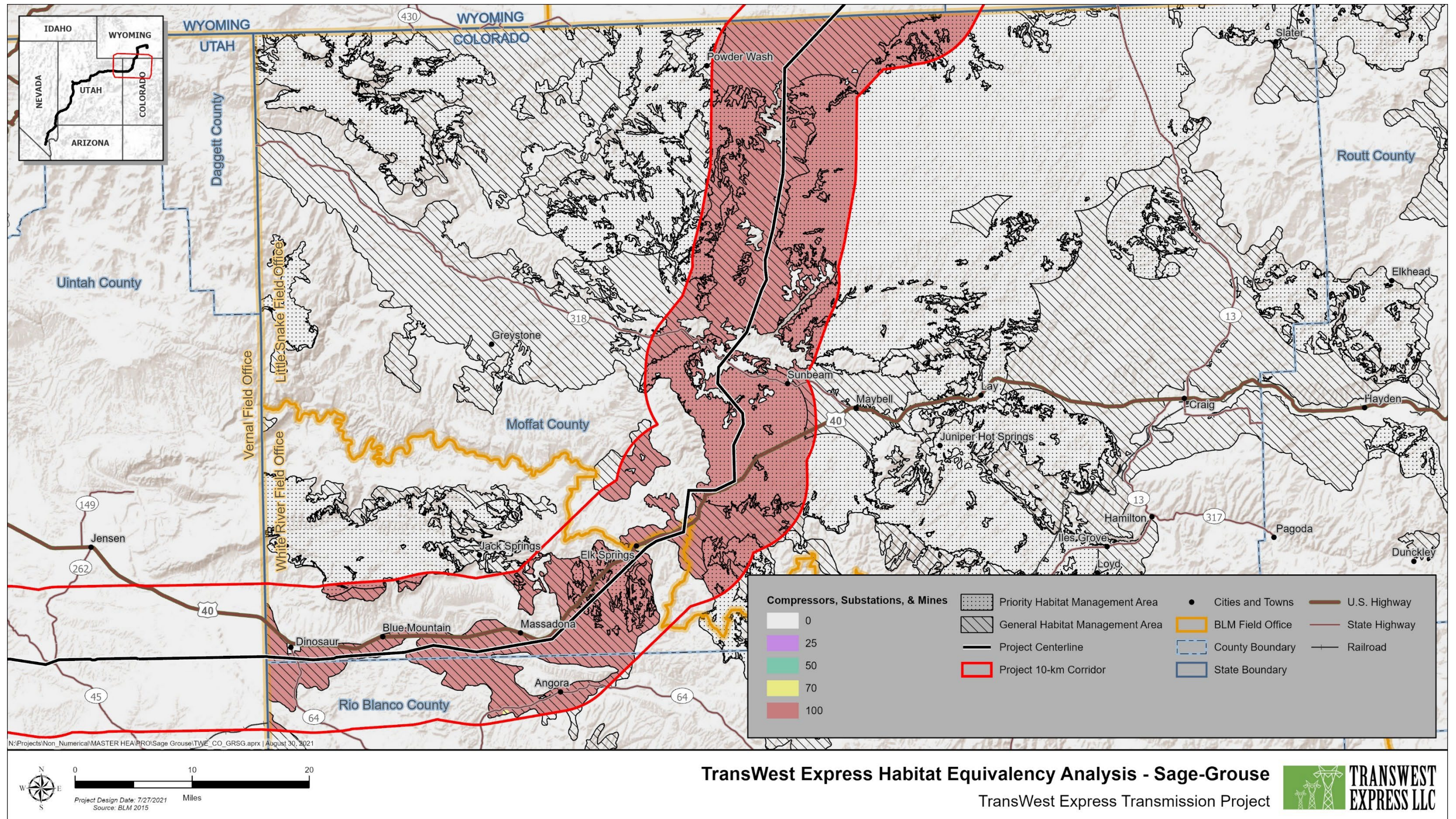
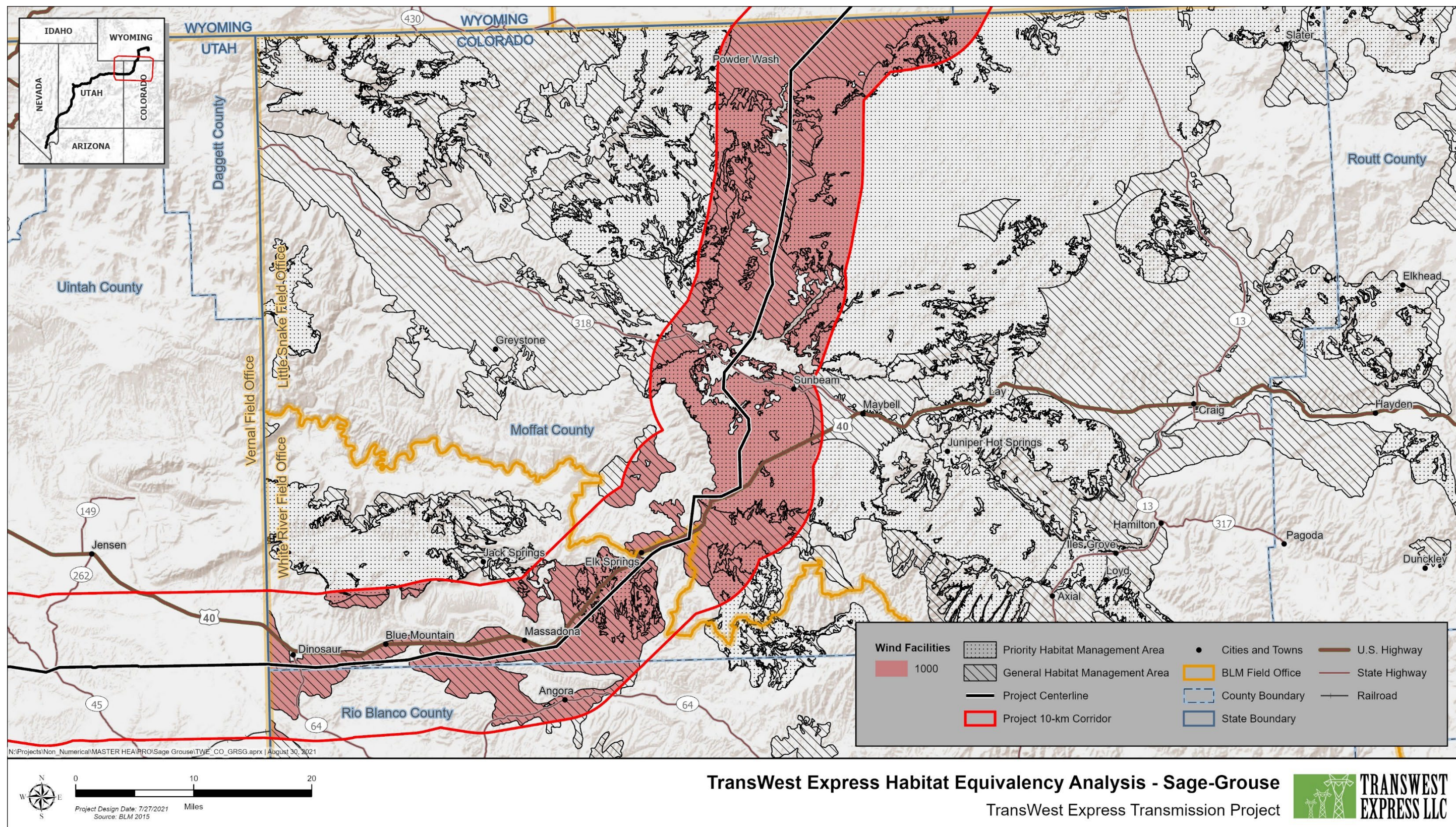


Figure B-11. Anthropogenic impact types: compressors, terminal, and similar noise sources.



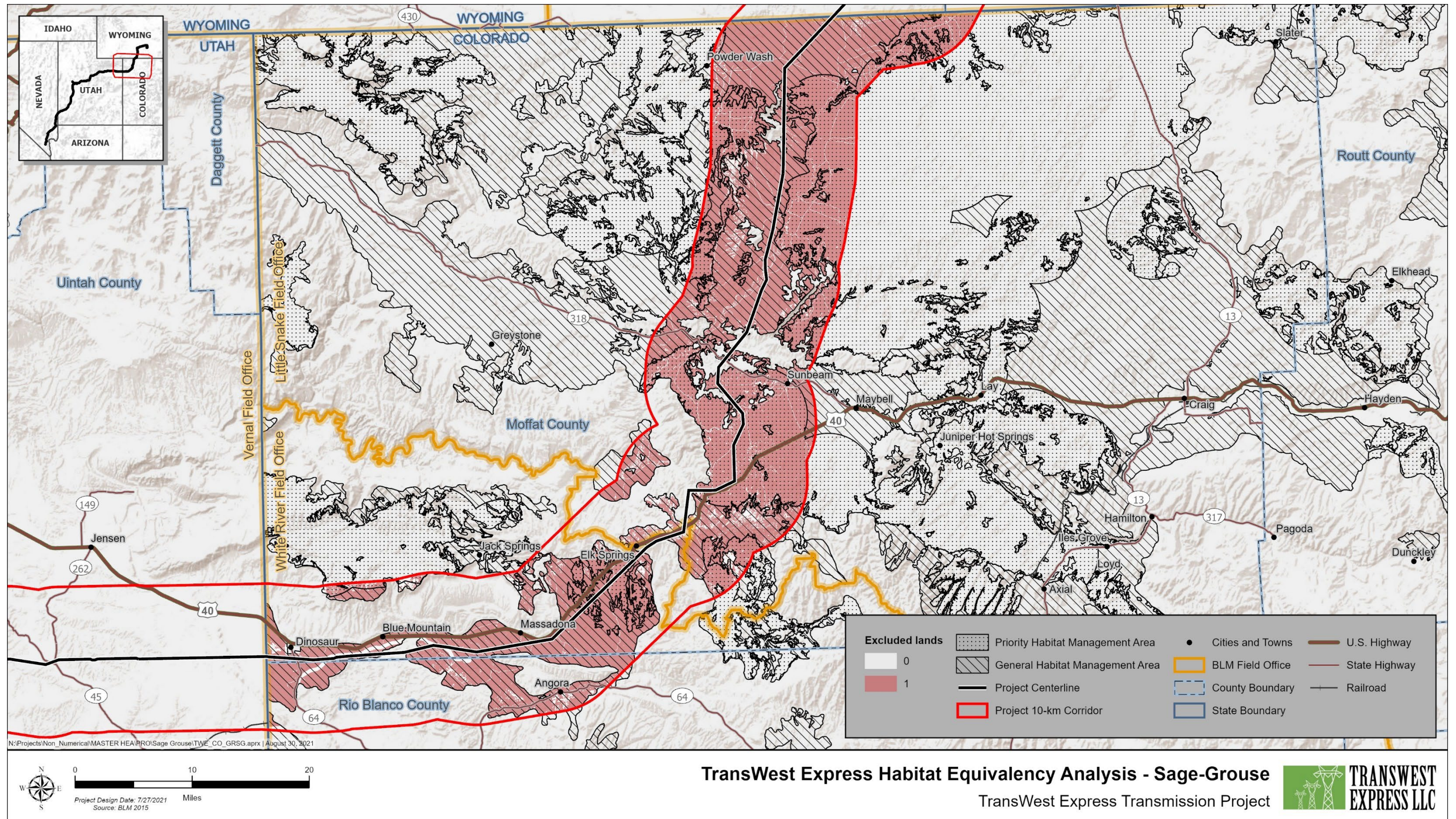


Figure B-13. Excluded lands.

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APPENDIX B-3

Habitat Equivalency Analysis Baseline Maps

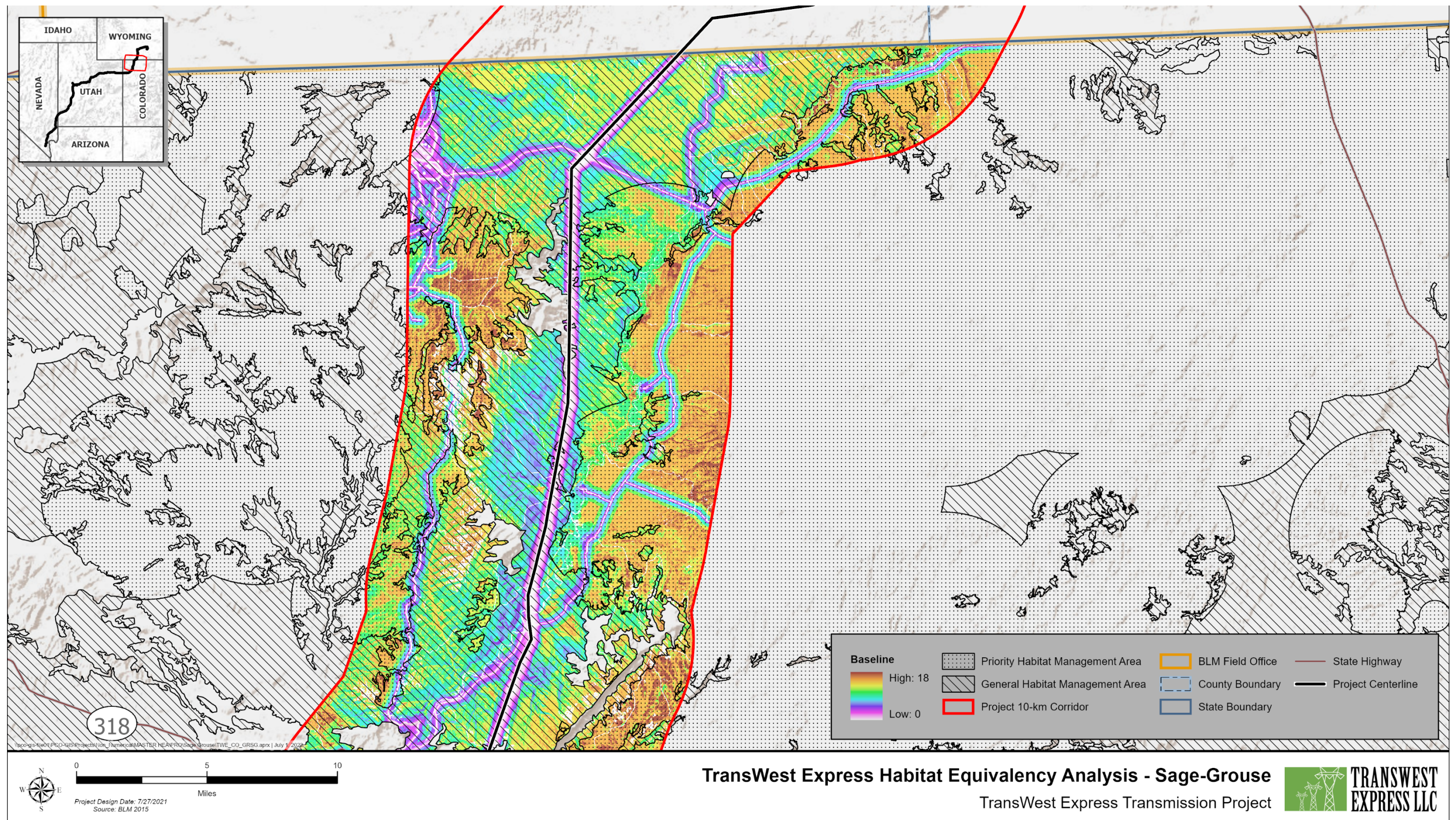


Figure B-14. Greater sage-grouse habitat equivalency analysis: baseline results.

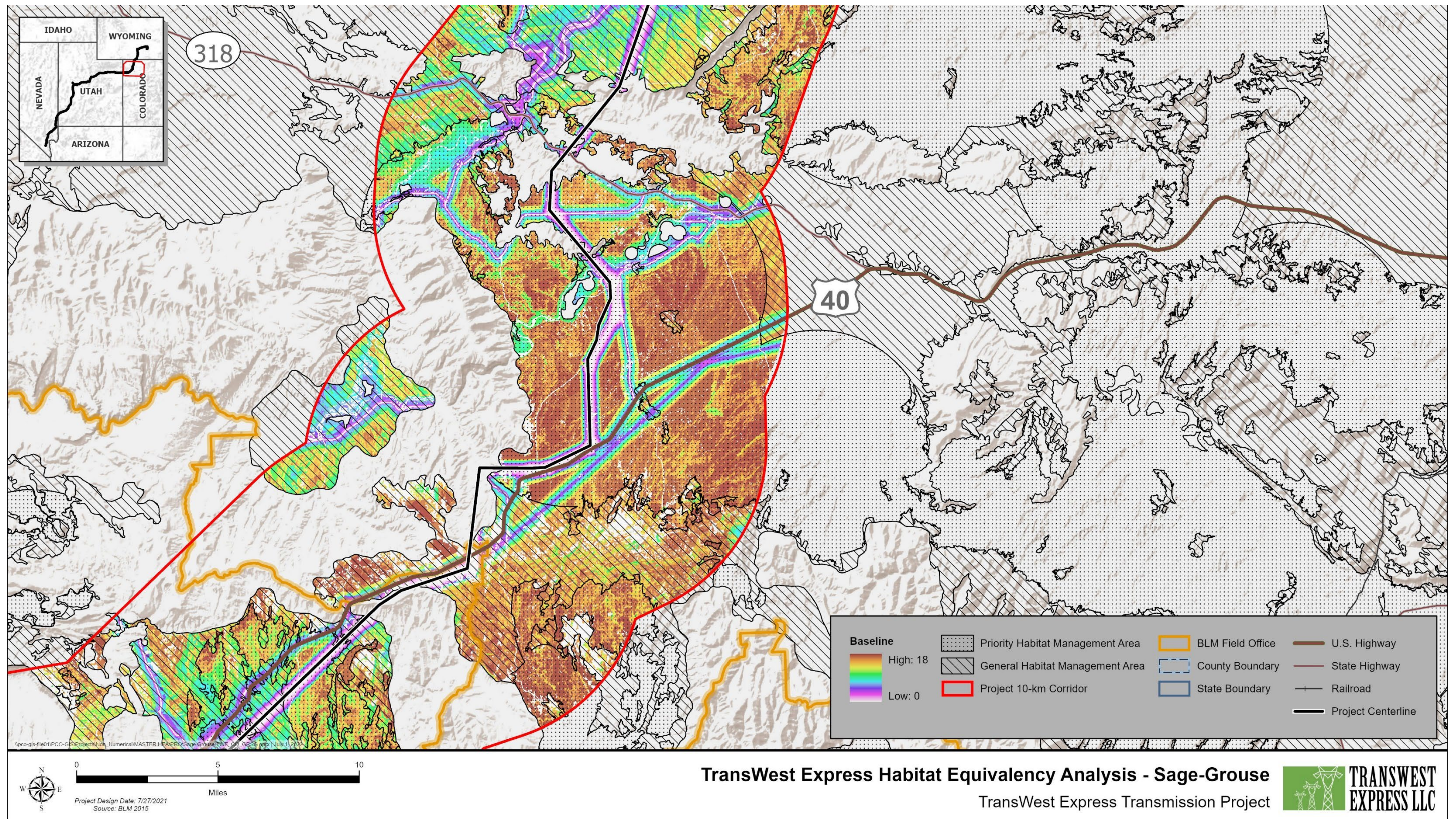


Figure B-15. Greater sage-grouse habitat equivalency analysis: baseline results.

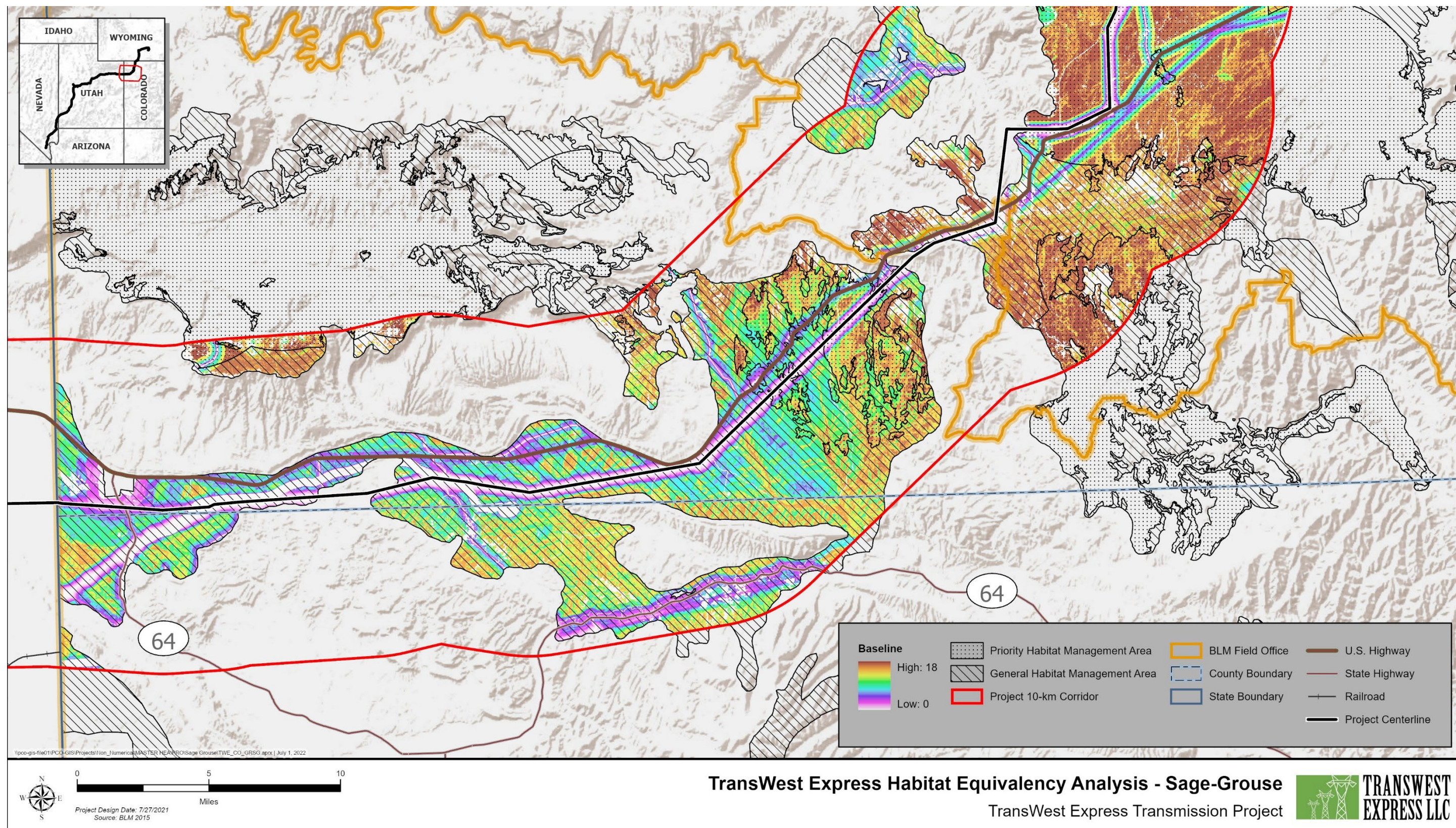


Figure B-16. Greater sage-grouse habitat equivalency analysis: baseline results.

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APPENDIX B-4

Habitat Equivalency Analysis Construction Maps

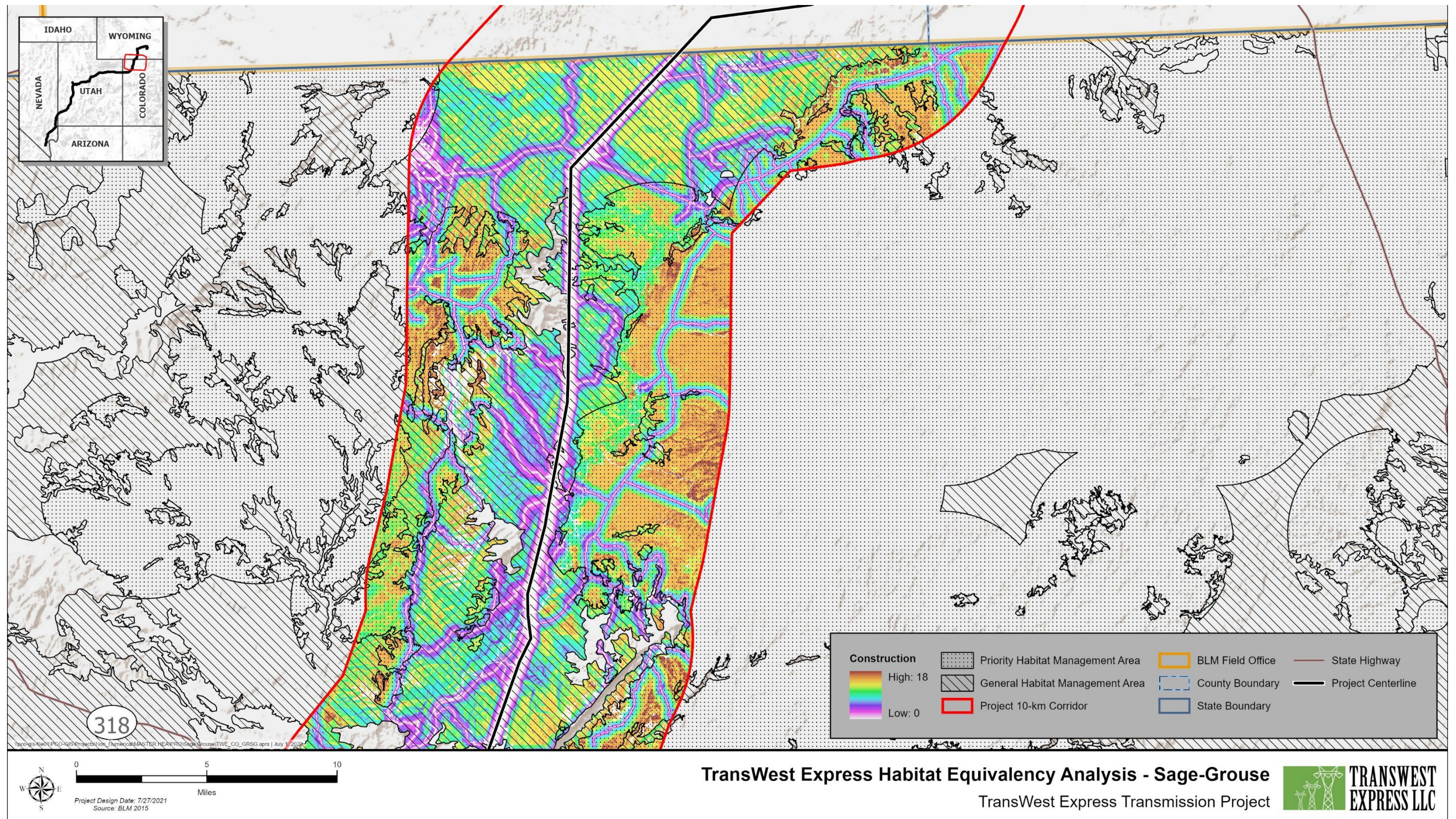


Figure B-17. Greater sage-grouse habitat equivalency analysis: construction results.

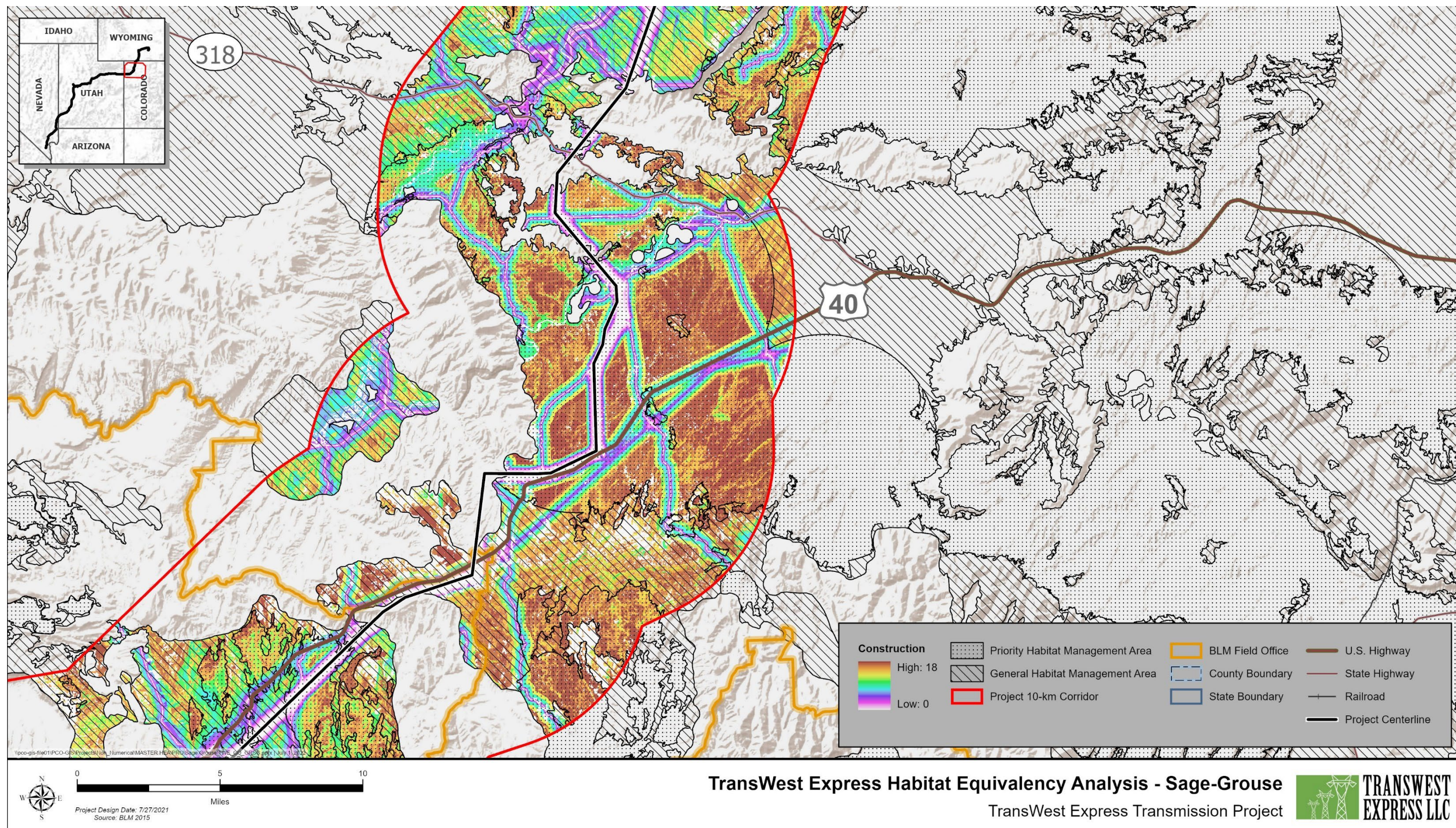


Figure B-18. Greater sage-grouse habitat equivalency analysis: construction results.

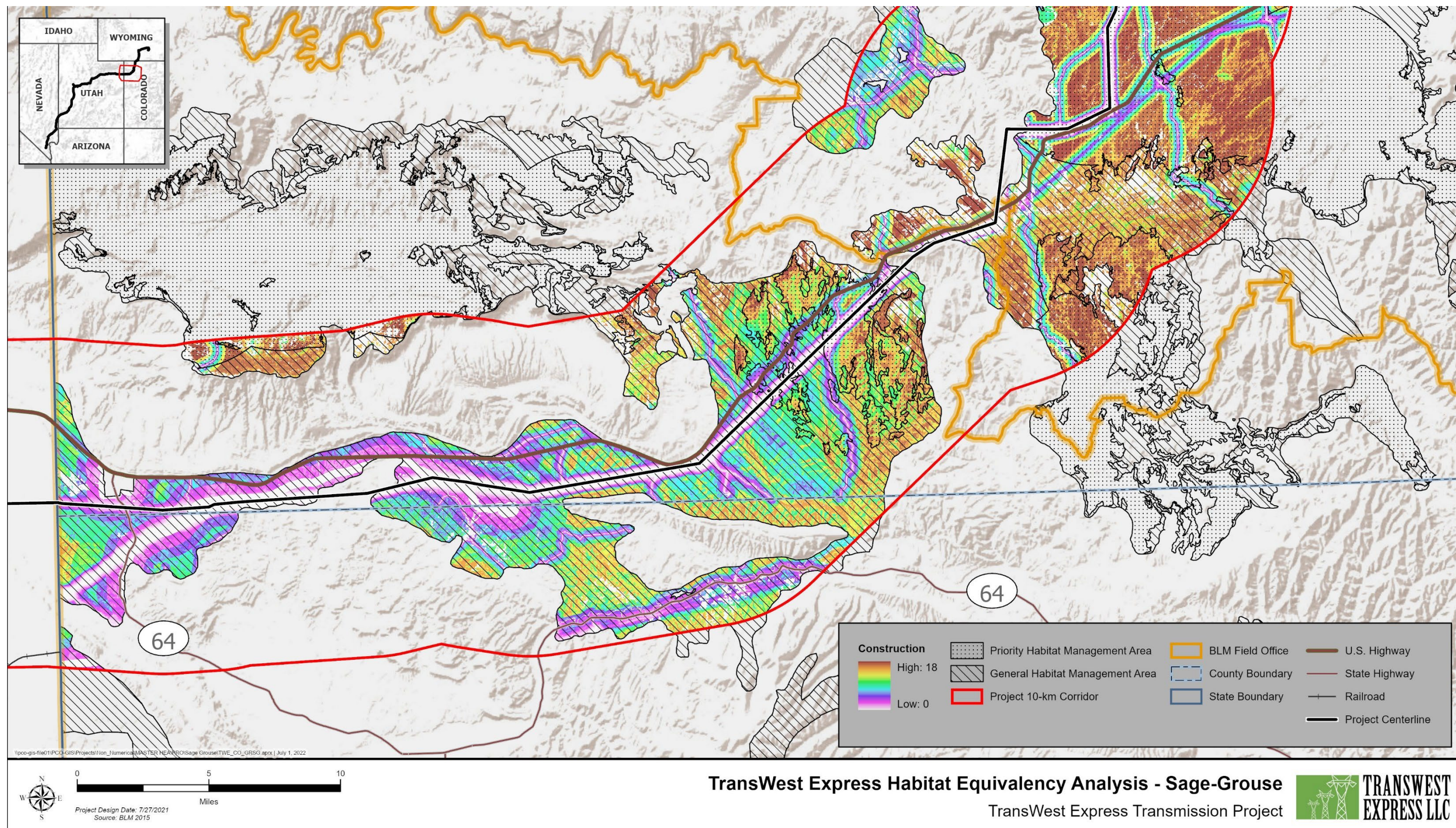


Figure B-19. Greater sage-grouse habitat equivalency analysis: construction results.

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APPENDIX B-5

Habitat Equivalency Analysis Restoration and Recovery Through Project Year 30 Maps

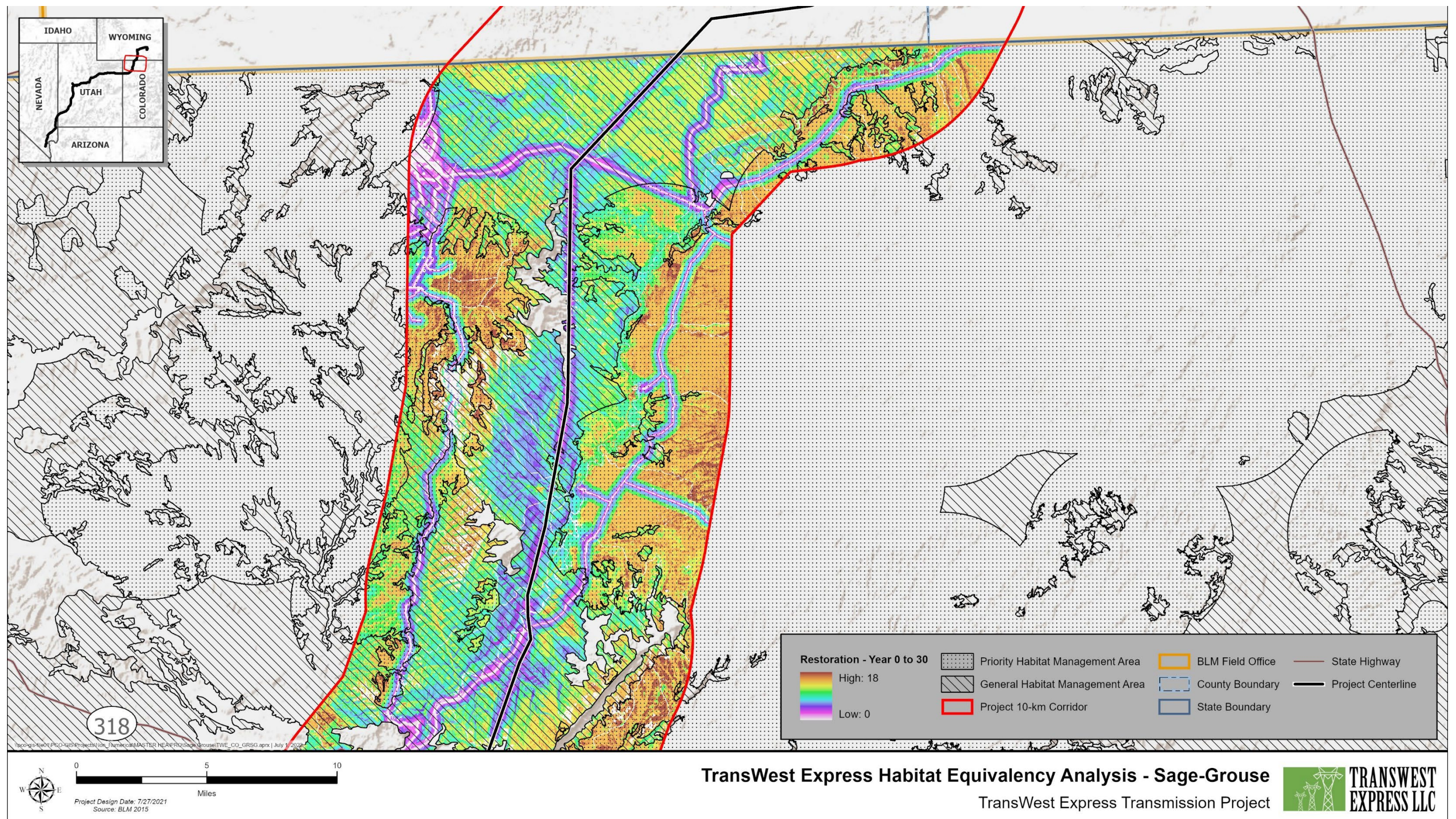


Figure B-20. Greater sage-grouse habitat equivalency analysis: restoration and recovery through Project Year 30.

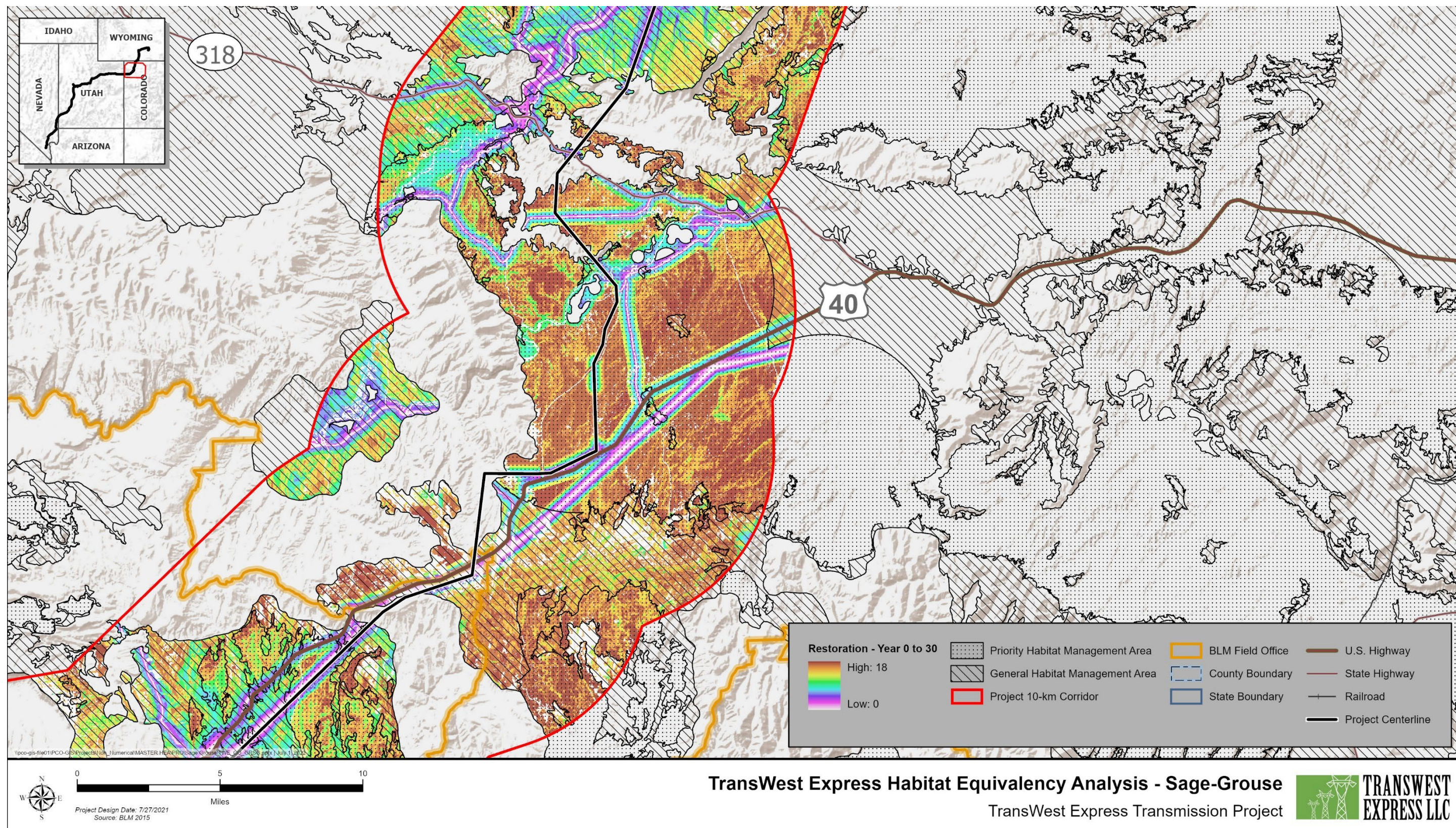


Figure B-21. Greater sage-grouse habitat equivalency analysis: restoration and recovery through Project Year 30.

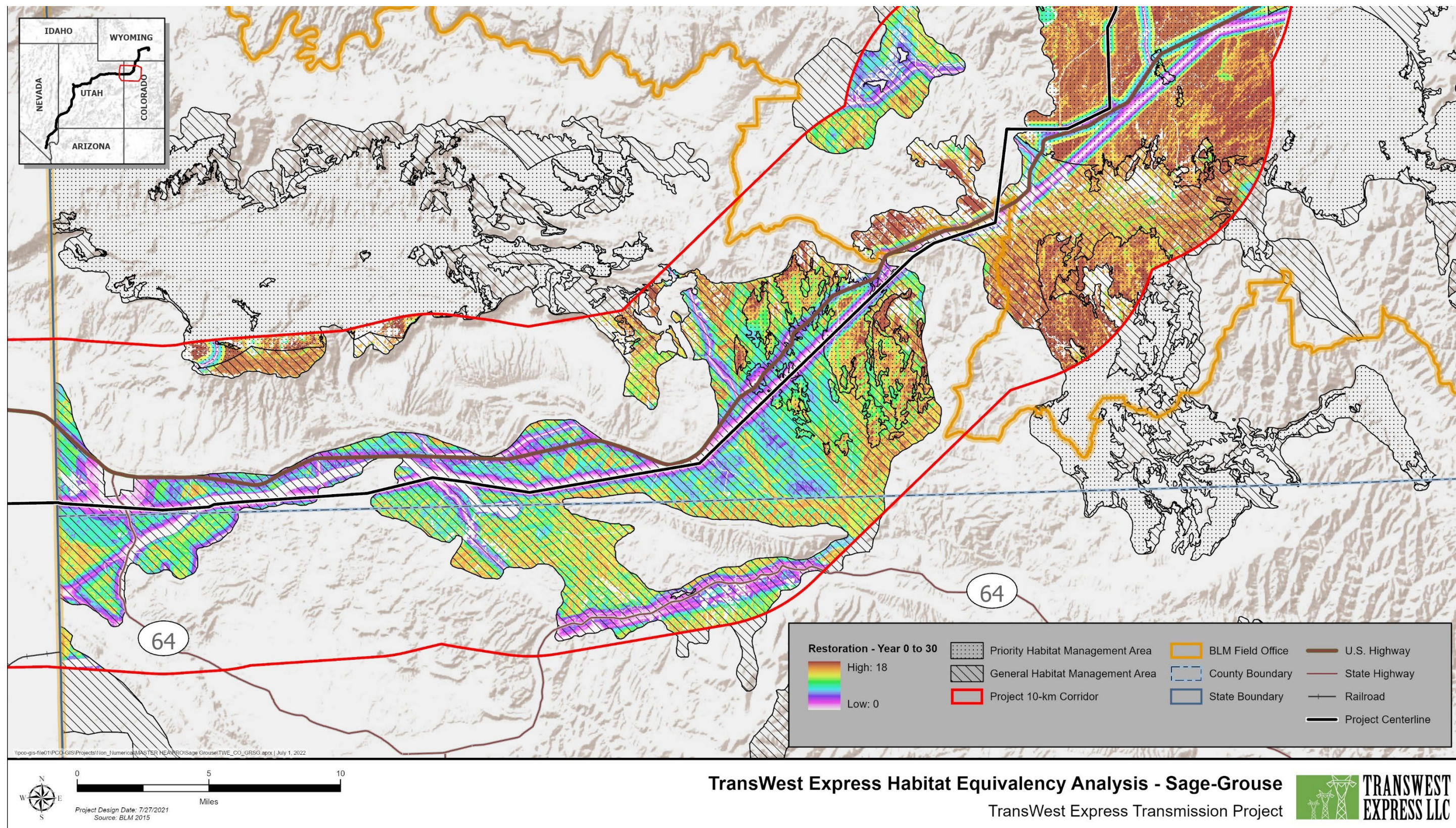


Figure B-22. Greater sage-grouse habitat equivalency analysis: restoration and recovery through Project Year 30.

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APPENDIX B-6

Habitat Equivalency Analysis Restoration and Recovery After Project Year 30 Maps

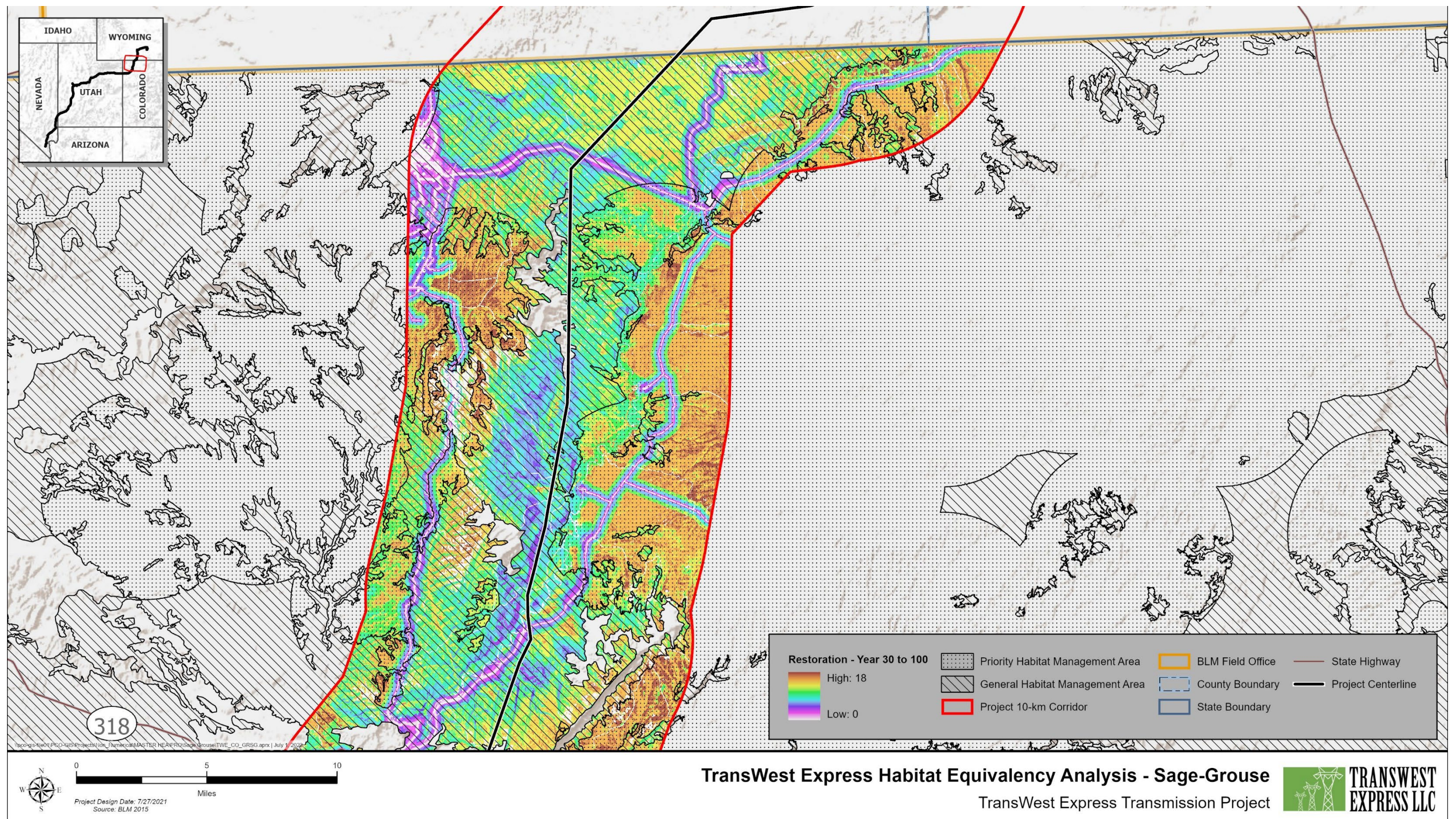


Figure B-23. Greater sage-grouse habitat equivalency analysis: restoration and recovery after Project Year 30.

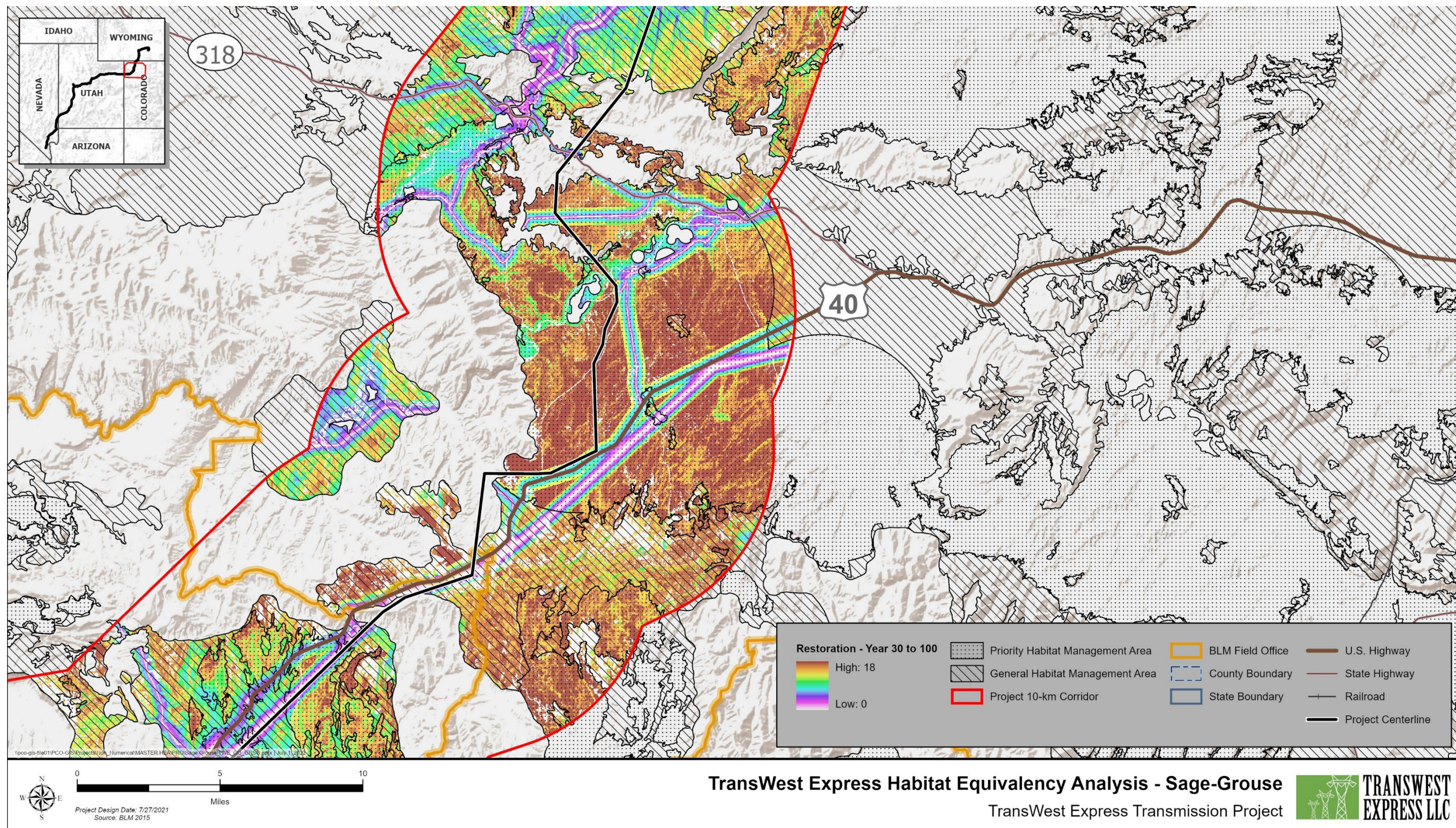


Figure B-24. Greater sage-grouse habitat equivalency analysis: restoration and recovery after Project Year 30.

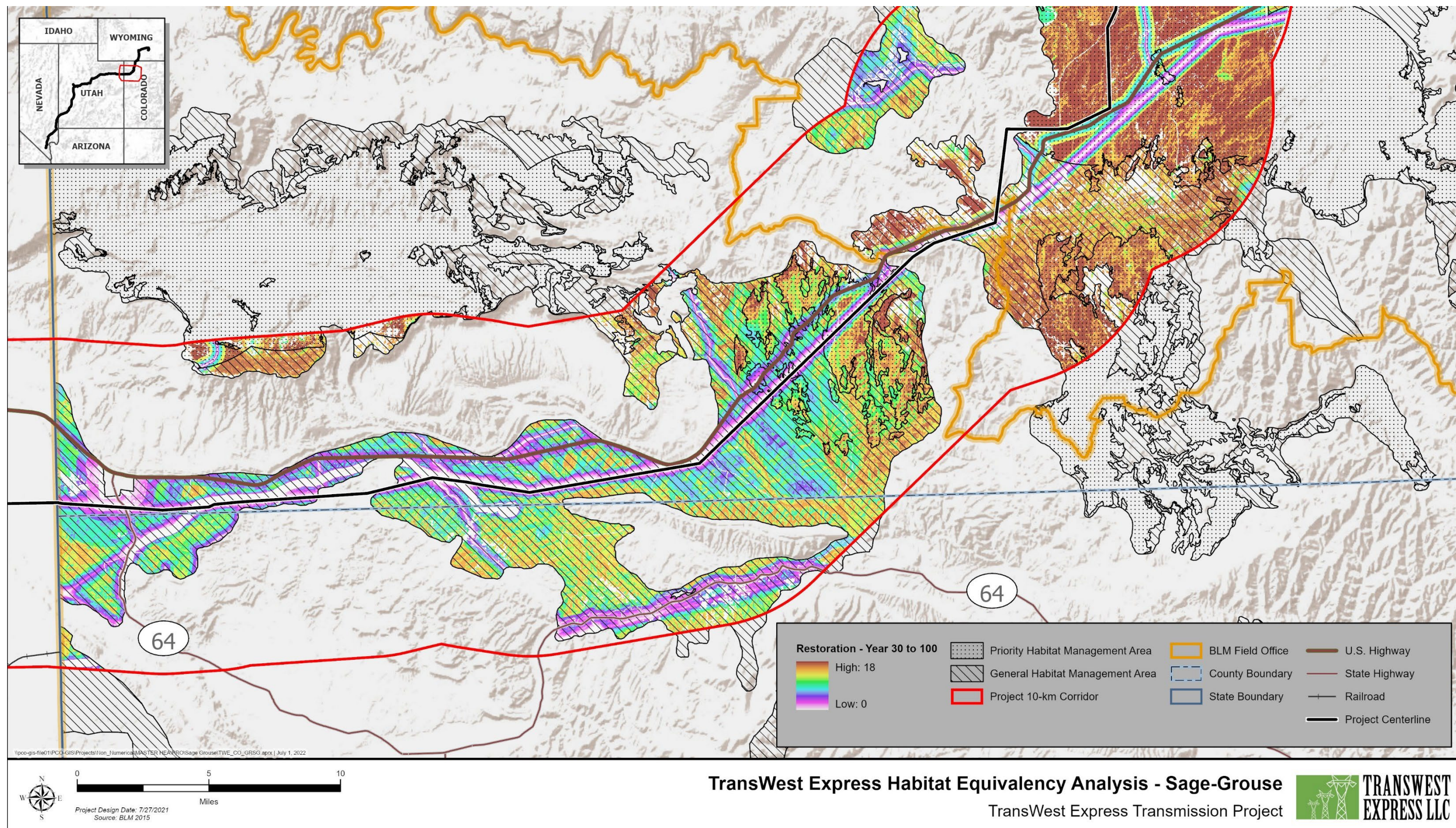


Figure B-25. Greater sage-grouse habitat equivalency analysis: restoration and recovery after Project Year 30.

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APPENDIX C

Vegetation- and Disturbance-Specific Recovery Rates

Project-related habitat service losses are anticipated to decrease once construction is complete. Although the habitat service scores will still be below baseline levels, the scores will rise during restoration and recovery with vegetation regrowth (direct disturbances) and decreased levels of noise and human presence (indirect disturbances).

For the restoration milestone, direct disturbances were defined as the loss of all habitat services in the construction footprint where vegetation clearing and ground disturbance has occurred because the vegetation has not regrown sufficiently to provide habitat. For the recovery milestone, direct disturbances were defined as the loss of all habitat services in the permanent structure footprint and the progressive return of habitat services in areas of vegetation regrowth per the vegetation recovery rates set in **Table C-1**. Services will return more rapidly for vegetation types having rapid recovery rates (e.g., agriculture, wetland, grassland, or riparian) than for those with slower recovery times (e.g., shrub-dominated including sagebrush).

Vegetation disturbance types described in the table are defined as follows:

- **Cleared.** Cleared of all vegetation, no intact root structure.
- **Mowed.** Mowed or bladed, root structure intact.
- **Drive and Crush.** Vegetation and soil left intact, root structure and seed bank remain in place.

Table C-1. Vegetation Recovery Rates for Interim Direct Impacts

Project Milestone	Percent of Baseline Services Present at Each Milestone by Disturbance Condition and Vegetation Recovery Endpoint		
	Cleared	Mowed	Drive and Crush
Baseline	<ul style="list-style-type: none"> • 100% of agricultural and wetland • 100% of grassland and riparian • 100% shrub • 100% of low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural and wetland • 100% of grassland and riparian • 100% shrub and low sagebrush • 100% of big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural and wetland • 100% of grassland and riparian • 100% shrub and low sagebrush • 100% of big sagebrush
Construction	<ul style="list-style-type: none"> • 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub • 0% of low and big sagebrush 	<ul style="list-style-type: none"> • 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub and low sagebrush • 0% of big sagebrush 	<ul style="list-style-type: none"> • 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub and low sagebrush • 0% of big sagebrush
Restoration	<ul style="list-style-type: none"> • 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub • 0% of low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, and riparian • 0% shrub and low sagebrush • 0% of big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, and riparian • 0% shrub and low sagebrush • 0% of big sagebrush
Recovery 1 (1 year after Restoration)	<ul style="list-style-type: none"> • 100% of agricultural and wetland • 20% of grassland and riparian • 5% shrub • 1% of low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, and riparian • 10% shrub and low sagebrush • 2% of big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, and riparian • 20% shrub and low sagebrush • 7% of big sagebrush
Recovery 2 (5 years after Restoration)	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, and riparian • 25% shrub • 5% of low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, and riparian • 50% shrub and low sagebrush • 10% of big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low sagebrush • 33% of big sagebrush
Recovery 3 (10 years after Restoration)	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, and riparian • 50% shrub • 10% of low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low sagebrush • 20% of big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low sagebrush • 67% of big sagebrush

Project Milestone	Percent of Baseline Services Present at Each Milestone by Disturbance Condition and Vegetation Recovery Endpoint		
	Cleared	Mowed	Drive and Crush
Recovery 4 (15 years after Restoration)	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, and riparian • 75% shrub • 15% of low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low sagebrush • 30% of big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush
Recovery 5 (20 years after Restoration)	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, and shrub • 20% of low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low sagebrush • 40% of big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush
ROW Term (30 years after Restoration)	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, and shrub • 30% of low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low sagebrush • 60% of big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush
Recovery 6 (50 years after Restoration)	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, and shrub • 50% of low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush
Recovery 7 (100 years after Restoration)	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush 	<ul style="list-style-type: none"> • 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush

Attachment D

National Mitigation and Conservation Account

Memorandum of Agreement

Between the Bureau of Land Management and the

National Fish and Wildlife Foundation

**National Mitigation and Conservation Account
Memorandum of Agreement
Between the Bureau of Land Management and the
National Fish and Wildlife Foundation**

PREAMBLE

This National Mitigation and Conservation Account Memorandum of Agreement (this “Agreement”) is entered into by the United States Bureau of Land Management (the “BLM”), and the National Fish and Wildlife Foundation (the “Foundation”) (together, the “Parties,” and individually, a “Party”), as of the date of the Parties’ signatures to the Agreement (such date, the “Effective Date”).

I. PURPOSE

The BLM is a federal agency within the Department of the Interior responsible for managing the public lands under principles of multiple use and sustained yield (43 U.S.C. 1732(a)). In accordance with congressional policy described in the Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. 1701(a)(8)), the BLM manages public lands in a manner that protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that appropriately preserves and protects certain public lands in their natural condition; that provides food and habitat for fish and wildlife and domestic animals; and that provides for outdoor recreation and human occupancy and use. The BLM also manages the public lands in a manner that recognizes the Nation’s need for domestic sources of minerals, food, timber, and fiber (43 U.S.C. 1701(a)(12)). To effectively manage for such multiple use, the BLM will, when appropriate and required by federal laws (e.g., FLPMA, the Clean Water Act or Endangered Species Act) or state mitigation plans, programs, or authorities, require mitigation to offset the impacts of some permitted uses of the public lands. Project applicants may also volunteer mitigation as a component of a project proposal and BLM may accept the mitigation and include it as a requirement of a Permit (as that term is defined below) (collectively referred to as “Decision Documents”). In either case, the Permittee (as that term is defined below) may provide funds to a third party to implement the mitigation in lieu of directly providing the mitigation.

To that end, the purpose of this Agreement is for the Foundation to establish a financial account (the “National Mitigation and Conservation Account” or “NMC Account”) to facilitate implementation of Mitigation Activities (as that term is defined below) for fish, wildlife, plants, and their habitats, and other natural resources (either voluntary or specifically required by federal or state law) relating to BLM authorizations to use the public lands. The Agreement will also help the BLM promote compliance with Decision Documents for permittees or other authorized public land users by allowing for the collection and administration of such funds by the Foundation.

The NMC Account will comprise specific Sub-Accounts (as that term is defined below), to be held, managed, and administered by the Foundation to receive monies paid by Permittees in

connection with impacts associated with projects authorized by the BLM. If a Permittee elects to use the NMC Account at the Foundation to satisfy terms and conditions or other requirements identified by the BLM for the use of the public lands, then the Permittee will provide funding to the Foundation for the Foundation to place in a Sub-Account associated with the Permittee's authorization. The Foundation, in turn, and in coordination with the BLM, will use the monies from the applicable Sub-Account to accomplish specified mitigation, conservation, protection, enhancement, restoration, or related purposes as specifically identified in BLM Decision Documents. The NMC Account may also receive monies paid as voluntary contributions to benefit conservation of important, scarce, or sensitive resources. Use of the NMC Account will be limited by the amount of money available in the Sub-Accounts at any given time, and by the stated purposes as described in the applicable Deposit Documents (as that term is defined below). Funds in the NMC Account will be disbursed in accordance with applicable Deposit Documents and, as appropriate, the instructions of the BLM.

Participation in the MOA does not diminish the BLM's autonomy, authority, or responsibility to conduct or accomplish its mission granted under applicable law or regulation. However, participation in the NMC Account by any BLM Office choosing to use any of the applicable Sub-Accounts established under this Agreement shall bind such BLM Office with respect to its use of the applicable Sub-Accounts to the terms of this Agreement with respect to such Sub-Accounts.

II. AUTHORITY

- A. The BLM is a federal agency within the Department of the Interior responsible for managing the public lands in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. 1701 *et seq.*). The BLM is authorized to enter into this Agreement pursuant to Section 307(b) of FLPMA (43 U.S.C. 1737(b)).
- B. The Foundation is a charitable non-profit corporation established in 1984 by the National Fish and Wildlife Foundation Establishment Act, 16 U.S.C. § 3701 *et seq.*, as amended (the "Establishment Act"), and is recognized as a tax exempt organization under Section 501(c)(3) of the Internal Revenue Code. The established purpose of the Foundation is to undertake and conduct other activities that will further the conservation and management of fish, wildlife, and plant resources of the United States for present and future generations of Americans. The Foundation is authorized to receive and administer funds for mitigation of impacts to natural resources, and other amounts arising from legal, regulatory, or administrative proceedings, subject to the condition that the amounts are received or administered for purposes that further the conservation and management of fish, wildlife, plants, and other natural resources (16 U.S.C. 3703(c)(1)(K)). The Foundation has no membership and it does not engage in advocacy.

III. DEFINITIONS

- A. "Administrative Costs" shall mean those fees or costs associated with the Foundation's administration of the NMC Account, or Sub-Accounts, associated with each Project and detailed in the Deposit Document. Such costs include standard fees for each Sub-Account

such as an Annual Fee, a Deposit Fee, any bank or financial institution charges, and RFP Fee. Administrative Costs do not include costs to implement Mitigation Activities, as defined in Section III.R. below. Administrative Costs are paid by the Permittee.

- B. “Agreement” shall have the meaning assigned to such term in the Preamble to this Agreement.
- C. “Annual Fee” shall have the meaning assigned to such term in Section VII.D. of this Agreement.
- D. “BLM” shall have the meaning assigned to such term in the Preamble to and Section II.A. of this Agreement.
- E. “BLM Contact Person” shall have the meaning assigned to such term in Section V.A. of this Agreement.
- F. “BLM Office” and “BLM Offices” shall mean any BLM State, District, or Field office.
- G. “BLM Representative” shall mean the single designated staff person representing the BLM as a whole (or his or her alternate, acting in the place of the BLM Representative) responsible for primary communications and administration related to this Agreement. If and to the extent the BLM elects to establish the Sub-Accounts listed in Sections VII.A. and VII.B. below, the BLM Representative (or his or her alternate) will designate a BLM State Office Representative for that particular Sub-Account under this Agreement (such person, a “BLM State Office Sub-Account Representative”), and shall notify the Foundation in writing of such election and, thereafter, the Sub-Account Representative shall function as the “BLM Representative” for that BLM State Office hereunder for purposes of the relevant Sub-Account.
- H. “BLM State Office Sub-Account” shall mean any Sub-Account identified in Section VII.A. of this Agreement, or any additional Sub-Account approved by the BLM Representative at the request of a BLM State Office and established by the Foundation.
- I. “BLM State Office Sub-Account Representative” shall mean the designated staff person for a particular BLM State Office Sub-Account or Resource Specific Sub-Account representing the respective BLM State Office responsible for primary communications and administration related to that BLM State Office Sub-Account or Resource-Specific Sub-Account.
- J. “Decision Document” shall have the meaning assigned to such term in Section I. of this Agreement.
- K. “Deposit Document” shall have the meaning assigned to such term in Section IV. of this Agreement.

- L. “Deposit Fee” shall mean the amount assessed by the Foundation on a one-time basis to establish each new Sub-Account within the NMC Account as set forth in Section VII.C. of this Agreement.
- M. “Effective Date” shall have the meaning assigned to such term in the Preamble to this Agreement.
- N. “Establishment Act” shall have the meaning assigned to such term in Section II.B. of this Agreement.
- O. “Fiscal Year” shall mean the fiscal year of the Foundation which, as of the date of this Agreement, commences on October 1st of each calendar year and runs through September 30th of the immediately following calendar year.
- P. “Foundation” shall have the meaning assigned to such term in the Preamble to and Section II.B. of this Agreement.
- Q. “Foundation Representative” shall mean the designated staff person for the Foundation (or his or her alternate, acting in the place of the primary Foundation Representative) responsible for primary communications and administration related to this Agreement.
- R. “Mitigation Activities” shall mean any biological or ecological mitigation or conservation actions included as a design feature in a project proposal, otherwise agreed to or volunteered by a project proponent, or required as a condition of approval, as identified in a Decision Document. Mitigation Activities include, but are not limited to, the restoration, enhancement, or protection of habitat and/or other natural resources; actions to protect or manage sensitive species or other natural resources; and other conservation actions.
- S. “NMC Account” shall have the meaning assigned to such term in Section I. of this Agreement.
- T. “Party” shall have the meaning assigned to such term in the Preamble to this Agreement.
- U. “Permit” shall mean any public land use authorization from the BLM, including but not limited to, a valid permit, right-of-way grant, lease, or other authorization instrument.
- V. “Permittee” shall mean any project proponent authorized by the BLM to use the public lands.
- W. “Recipient” shall mean any entity that receives monies from the NMC Account for the performance of Mitigation Activities as set forth in a Recipient Agreement.
- X. “Recipient Agreement” shall mean a contract, grant agreement, purchase order, invoice, or other written agreement between the Foundation and a Recipient for the performance

of a project to be funded through a Sub-Account within the NMC Account, as approved by the BLM in accordance with the applicable Deposit Document(s).

- Y. “Resource-Specific Sub-Account” shall mean any Sub-Account identified in Section VII.B. of this Agreement, or any additional Resource-Specific Sub-Account approved by the BLM Representative at the request of one or more BLM State Offices.
- Z. “RFP” shall have the meaning assigned to such term in Section V.D.3. of this Agreement.
- AA. “RFP Fee” shall have the meaning assigned to such term in Section V.D.3. of this Agreement.
- BB. “Sub-Account” shall mean each individual account established under the NMC Account. Each Sub-Account will be tracked and accounted for by the Foundation in a manner that allows the funds on deposit in, and the account activity related to, each Sub-Account to be distinguishable from other Sub-Accounts within the overall NMC Account.

IV. DEPOSIT DOCUMENT

- A. The Deposit Document shall be a standard form created by the BLM that contains, at a minimum, the following information:
 - 1. amount of funds being deposited into the Sub-Account;
 - 2. Permittee/payor of funds;
 - 3. stated purpose of the funds and, if applicable, a citation (e.g., page, section, condition number) to the applicable Decision Document(s);
 - 4. the BLM Offices that have the responsibility to approve and verify implementation of the funds being deposited into the Sub-Account;
 - 5. staff person contact information for the designated BLM Contact Person for the project;
 - 6. staff person contact information for the designated BLM State Office Sub-Account Representative for the Sub-Account; and
 - 7. if applicable, written notification that the State Office Sub-Account Representative shall function as the “BLM Representative” for that BLM State Office for purposes of the Sub-Account.
- B. The current version of the Deposit Document is attached hereto as Attachment 1. The Deposit Document may be modified at any time by mutual written consent of the Parties without the need for an amendment to this Agreement.
- C. A copy of BLM’s applicable Decision Document containing the specified Mitigation Activities for the project will be submitted to the Foundation with the Deposit Document.

V. BLM RESPONSIBILITIES

- A. The BLM shall appoint a BLM Representative, who shall represent the BLM in carrying out the BLM’s obligations under this Agreement. The BLM Representative and BLM

State Office Sub-Account Representatives, as described in Sections III.G. and III.I. above, shall be the only persons authorized to approve whether a permittee may make a deposit with NFWF into the NMC Account and Sub-Accounts within the NMC Account in accordance with the BLM Decision Documents. The BLM State Office Sub-Account Representative and the “BLM Contact Person,” as described in Section III.E. above, named on the Deposit Document are the persons from the BLM authorized to verify that disbursements from a BLM State Office Sub-Account or Resource-Specific Sub-Account, as applicable, satisfy BLM mitigation requirements described in a BLM Decision Document. The BLM Contact Person for the Project will ensure disbursements from the Sub-Account are in accordance with the applicable Decision Document and Deposit Document. The BLM State Office Sub-Account Representative and the BLM Contact Person shall be the only persons authorized to provide approval to NFWF for disbursements from the applicable Sub-Account to ensure they are in accordance with BLM Decision Documents. All approvals and actions by the BLM Representative, the BLM Contact Person, and BLM State Office Sub-Account Representatives with respect to funds in the NMC Account shall be in accordance with the applicable Deposit Document and this Agreement.

- B. The applicable BLM Office will transmit to the Foundation the completed Deposit Document and supporting documents. The funds identified in the Deposit Document will be sent directly from the Permittee or by the payor on behalf of the Permittee to the Foundation in accordance with payment instructions provided by the Foundation.
- C. The Foundation may request the applicable BLM Contact Person or BLM State Office Sub-Account Representative to review and approve, in writing, a Recipient Agreement for the performance of Mitigation Activities to be funded, in whole or in part, with monies in the applicable Sub-Accounts within the NMC Account in accordance with the identified BLM Decision Document(s) and the applicable Deposit Document(s). The Mitigation Activities may be identified and approved by BLM, through any of the procedures set forth in Section V.D. below. The applicable BLM Contact Person or BLM State Office Sub-Account Representative shall be entitled, after providing a prior written request to the Foundation, to review and approve any (1) Recipient Agreement, including any amendment thereto, prior to execution and (2) requests from Recipients for disbursements of funds from any Sub-Account within the NMC Account, prior to such disbursements being made.
- D. In coordination with the Foundation, the applicable BLM Contact Person or BLM State Office Sub-Account Representative, will review and confirm that funding under the NMC Account is appropriate for any proposed project identified through any of the following procedures if the BLM Contact Person or BLM State Office Sub-Account Representative verifies in writing that the proposed project would satisfy the requirements of Mitigation Activities to be funded, in whole or in part, with monies in the applicable Sub-Accounts within the NMC Account in accordance with the identified BLM Decision Document(s) and the applicable Deposit Document(s):

1. The BLM Contact Person or BLM State Office Sub-Account Representative may consult with the Foundation regarding proposed projects that it is aware of or are otherwise brought to the BLM's attention by the Permittee or other entities in the applicable geography;
 2. The BLM Contact Person or BLM State Office Sub-Account Representative may consult with the Foundation regarding proposed projects submitted in response to one of the Foundation's regularly scheduled general calls for proposals; and
 3. The BLM Representative or BLM State Office Sub-Account Representative may confirm that it is appropriate for the Foundation to conduct one or more specific requests or calls for proposals (each, an RFP) for Mitigation Activities to be funded by the applicable Sub-Account(s) and use the funding from the applicable Sub-Account one or more Mitigation Activities submitted in response to any such RFP. If an RFP is a foreseeable procedure for identifying appropriate Mitigation Activities, after consultation with the Foundation, the applicable BLM Representative and BLM State Office Sub-Account Representative shall identify in the Deposit Document the RFP Fee of \$30,000, as expressed in 2022 dollars and as adjusted annually after 2022 based on an annual CPI escalator. The Foundation's receipt of the RFP Fee from the permittee is an express condition precedent to the Foundation's obligation under this Agreement to conduct any such RFP.
- E. The BLM agrees that, under certain circumstances, following written approval from the applicable BLM Contact Person(s) or BLM State Office Sub-Account Representative(s), the Foundation may disburse funds from multiple Sub-Accounts to complete Mitigation Activities that result in a cost savings or increased conservation benefit provided that the use of such funds for the implementation of such Mitigation Activities is required or allowed by the applicable Decision Documents.
- F. If additional funds are needed, beyond those already deposited into the relevant Sub-Account, to fully complete the Mitigation Activities identified in the Deposit Document or to pay Administrative Costs, the applicable BLM Office(s) may, in accordance with applicable law, require a Permittee to deposit additional funds into the applicable Sub-Account to pay for the Mitigation Activities and Administrative Costs, including but not limited to the RFP Fee described in Section V.E. above.
- G. Requests from the public for release of information about the NMC Account will be directed to the BLM Representative. Such requests will be governed by the requirements of the Freedom of Information Act, Privacy Act, and other authorities, as applicable.

VI. FOUNDATION RESPONSIBILITIES

- A. The Foundation shall appoint the Foundation Representative and an alternate, who shall represent the Foundation in carrying out its obligations under this Agreement.

- B. The Foundation understands and agrees that all monies deposited by Permittees in the NMC Account, including all Sub-Accounts, shall, depending on the purpose and tenure of such monies, either be held in cash (i.e., not invested) or be maintained in an interest bearing or investment account (i.e., invested) at one or more financial institutions that is a member of the Federal Deposit Insurance Corporation or the Securities Investor Protection Corporation, or successors to those institutions, as applicable. The Foundation may consult with the BLM to attain information on timelines, purpose, and tenure applicable to deposited funds to assist the Foundation in selecting appropriate investment strategies for Sub-Accounts. The Foundation shall invest applicable amounts in a Sub-Account in accordance with the Foundation's then-prevailing investment policy statement governing cash management or other applicable investment policy statements, as provided in Section VII.F. below. For accounting purposes, the NMC Account shall be distinguishable from all other accounts maintained by the Foundation. The Foundation shall also ensure that all Sub-Accounts within the NMC Account are distinguishable from each other.
- C. With respect to monies to be invested, the Foundation shall invest such monies consistent with Section VI.B. of this Agreement and applicable Local, State and Federal laws and in accordance with the consultation with the BLM Representative, BLM Contact Person, or BLM State Office Representative referenced in the immediately preceding Section VI.B., as applicable. Investment strategies for applicable monies in the NMC Account shall be implemented by one or more financial institutions retained by the Foundation. In addition, if requested by the BLM as part of the consultation with the BLM Representative, BLM Contact Person, or BLM State Office Representative referenced in the immediately preceding Section VI.B., the Foundation shall invest the funds in any Sub-Account within the NMC Account in a distinct investment pool to reflect a specified purpose and tenure of the relevant funds as identified by the BLM in the applicable Deposit Document. Day-to-day investment decisions will be made by the professional investment advisor or bank with which the Foundation has established or will establish an investment advisory relationship. The Foundation may rely on the advice of any such adviser, and may delegate investment decision-making authority, consistent with applicable Local, State and Federal law, to such adviser with respect to management of the NMC Account or any Sub-Account. Investment income accruing to the NMC Account shall be apportioned *pro rata* to each Sub-Account (and credited thereto) based on the respective balances on deposit in each Sub-Account and the investment strategy applicable to each such Sub-Account, and shall be used to carry out the purposes of the various Sub-Accounts as set forth in the Deposit Document.
- D. For investment purposes only, the Foundation is authorized to commingle any or all of the assets existing in the NMC Account with other funds held or managed by the Foundation that are subject to identical investment restrictions. The intent of this authorization is to allow the Foundation to pool funds subject to identical investment restrictions for collective management, such that all participating funds may benefit from efficiencies of scale. In addition, notwithstanding this authorization, and in accordance with Section VI.B. above, funds in the NMC Account and the Sub-Accounts shall at all

times be distinguishable and uniquely identifiable within the Foundation's internal account system from all other funds maintained or managed by the Foundation.

- E. The Foundation shall administer the NMC Account consistent with Section VII. below.
- F. For all Sub-Accounts, the Foundation shall pay Recipients' requests for disbursements as approved by the applicable BLM Contact Person or BLM State Office Sub-Account Representative, as applicable, in writing and in accordance with the procedures set forth in the respective Recipient Agreements and/or Decision Documents, as applicable.
- G. If requested by the applicable BLM Contact Person or BLM State Office Sub-Account Representative, the Foundation shall participate with the BLM in technical reviews at reasonable intervals, if any, to evaluate the progress and results of projects funded by the NMC Account. In consultation with the applicable BLM Contact Person or BLM State Office Sub-Account Representative, the Foundation will take appropriate steps to terminate or cancel a Recipient Agreement for a project pursuant to the terms of the applicable Recipient Agreement.
- H. To the extent funds are available in the applicable Sub-Account, the Foundation may retain one or more land acquisition consultants for selected projects and programs in consultation with the BLM Contact Person or BLM State Office Representative, as applicable. Services to be procured by the Foundation in this respect may include review of acquisition plans, appraisal reviews, site visits, land negotiations, and other related services required for Mitigation Activities and to assist BLM in its determination as to whether proposed Mitigation Activities to be funded, in whole or in part, with monies in the applicable Sub-Accounts within the NMC Account are in accordance with the identified BLM Decision Document(s) and the applicable Deposit Document(s).
- I. If additional funds are needed to fully complete the Mitigation Activities identified in the Deposit Document, the Foundation shall notify the BLM. Nothing in this Agreement shall obligate or be deemed or construed to obligate the Foundation to make or commit to make any expenditure of funds beyond those deposited into a Sub-Account.

VII. ACCOUNT ADMINISTRATION

- A. Within forty-five (45) days after the Effective Date, the Foundation shall establish the NMC Account. In connection with its creation and funding within the NMC Account, the Foundation will establish the following initial BLM State Office Sub-Accounts under this Agreement as and when the Foundation receives a Deposit Fee from the first depositor (i.e., the first Permittee to use the Sub-Account) for the establishment of each such Sub-Account:
 - 1. BLM Alaska State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.

2. BLM Arizona State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
3. BLM California State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
4. BLM Colorado State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
5. BLM Idaho State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
6. BLM Montana-Dakotas State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
7. BLM Nevada State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
8. BLM New Mexico State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
9. BLM Oregon-Washington State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
10. BLM Utah State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.

11. BLM Wyoming State Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
 12. BLM Eastern States Office Sub-Account: Funds deposited into this single, comingled, non-project-specific Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the BLM and are to be used as specified in the Deposit Document for each deposit.
- B. In addition to the twelve (12) non-resource-specific BLM State Office Sub-Accounts listed in Section VII.A. above, the Foundation will establish the following Resource-Specific Sub-Accounts under this Agreement as and when the Foundation receives a Deposit Fee from the first depositor (i.e., the first Permittee to use the Sub-Account) for the establishment of each such Sub-Account:
1. Flat-Tailed Horned Lizard Conservation Sub-Account: Funds deposited into this comingled Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of the California and Arizona BLM Offices, and are to be used as specified in the Decision Document for each deposit.
 2. Arizona Desert Tortoise Mitigation Sub-Account: Funds deposited into this comingled Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of Arizona BLM Offices, and are to be used as specified in the Decision Document for each deposit.
 3. Nevada Desert Tortoise Mitigation Sub-Account: Funds deposited into this comingled Sub-Account are for projects that are permitted by, or otherwise subject to the jurisdiction of Nevada BLM Offices, and are to be used as specified in the Decision Document for each deposit.
- C. The Foundation shall assess and collect a Deposit Fee from the first depositor (i.e., the first Permittee to use the Sub-Account) for the establishment of each Sub-Account (such Deposit Fee to be deducted from the initial deposit into the Sub-Account itself if not paid from a separate source). The Deposit Fee for each Sub-Account listed in Sections VII.A. and VII.B. above, and any Sub-Account established pursuant to Section VII.H. below, shall be Three Thousand Four Hundred Dollars (\$3,400).
- D. The Foundation shall assess and collect an Annual Fee against each Sub-Account either quarterly (in one-fourth increments) or annually (based on the Foundation's Fiscal Year), in either case at the Foundation's election, during each Fiscal Year in which the NMC Account is in existence. The Annual Fee is collected from the balance of the applicable Sub-Account. The Annual Fees for each BLM State Office Sub-Account listed in Sections VII.A. and VII.B. above, will be the greater of (i) three percent (3%) of the Sub-Account's balance at the time of calculation or (ii) One Thousand Dollars (\$1,000) or as agreed upon by the BLM and the Foundation. The Annual Fees for any additional Sub-

Account will be mutually agreed upon by the BLM and the Foundation, and specified in the written notice provided pursuant to Section VII.H. below.

- E. Bank charges assessed by any financial institution with respect to management of any Sub-Account will be assessed against and collected from the balance of the applicable Sub-Account.
- F. Unless requested otherwise by the BLM in writing as part of the consultation with the BLM Representative, BLM Contact Person, or BLM State Office Representative referenced in Section VI.B., the Foundation shall either hold amounts in the NMC Account in cash or shall invest amounts in the Sub-Accounts identified in Sections VII.A. and VII.B. above, in accordance with the Foundation's then-prevailing investment policy statement governing cash management. See Section VI.B. above, for details on the Foundation's investment strategies.
- G. Unless requested otherwise by the BLM in writing, the Foundation shall submit NMC Account activity reports on the Sub-Accounts to the applicable BLM or Sub-Account Representatives semi-annually by June 15 and December 15 of each year the NMC Account is in existence. The Foundation shall report on deposits, disbursements, fees, and investment activity during each applicable reporting period, with a reconciliation of the remaining unobligated balance in each Sub-Account. The reports will also include the current status of all active Recipient Agreements. At the BLM's written request, the Foundation shall provide to the BLM Representative copies of its audited financial statements.
- H. The BLM Representative may request additional Sub-Accounts to be established under this Agreement. The Parties agree and acknowledge that, at their mutual election, additional Sub-Accounts may be established and the terms of existing Sub-Accounts within the NMC Account may be modified through the execution of a modification to the Deposit Document under Section IV.B. of this Agreement by mutual written consent of the Parties without the need for an amendment to this Agreement. Such modification shall include all provisions applicable to the Sub-Account, including but not limited to the applicable investment policy statement for the Sub-Account. If the Parties determine the establishment of a new type of Sub-Account necessitates the execution of a further written agreement setting forth new terms or conditions, the Parties shall enter into a written agreement, which shall be deemed to supersede the provisions of this Agreement with regard to that type of Sub-Account.
- I. No funds received by or disbursed from the NMC Account may be used by any Recipient to pay for lobbying activities, any illegal activities, or litigation.
- J. No funds disbursed from the NMC Account may be used to unlawfully augment any BLM federal appropriations, whether in violation of the United States Constitution, Title 31, U.S.C. § 1301(a) (the "Purpose Statute"), Title 31, U.S.C. § 1341 (the "Anti-Deficiency Act"), Title 31, U.S.C. § 3302(b) (the "Miscellaneous Receipts Act"), or other applicable law.

VIII. TERMINATION OF AGREEMENT

- A. This Agreement shall terminate upon any of the following events: 1) the Parties agree to termination of this Agreement in writing (which may or may not be because all the monies in the NMC Account have been disbursed); or 2) one Party gives the other Party sixty (60) days prior written notice of its intent to withdraw from the Agreement. Notwithstanding the preceding sentence, termination is not effective unless and until all funds in the NMC Account are disbursed in accordance with the terms of subsection B below.
- B. In the event of termination of this Agreement prior to all monies in the NMC Account having been expended, the Foundation shall immediately (unless otherwise requested by the BLM Representative in writing) undertake all reasonable steps to disburse remaining funds in the NMC Account cooperatively with the BLM, which steps shall include but not be limited to the following:
1. Direct Recipients to stop any unfunded work;
 2. Direct Recipients to place no further work orders or enter into any further contracts for materials, services, or facilities, except as necessary to complete work;
 3. Enter into no further contracts with Recipients and terminate all pending contracts (to the extent such contracts allow) for project work that has not yet commenced;
 4. Promptly take all other reasonable steps to minimize the additional obligation of NMC Account funds;
 5. Deliver or make available to the BLM all data, drawings, specifications, reports, summaries, and such other information and material as may have been developed under this Agreement or any project documents, whether completed or in progress; and
 6. Disburse remaining funds in the NMC Account according to the BLM's written request and in accordance with applicable law, withholding an amount sufficient to pay outstanding obligations that remain after any required steps, which may include, but are not necessarily limited to (1) through (5) above have been completed.
- C. Within ninety (90) days following final disbursement of the funds in the NMC Account, the Foundation shall provide to the BLM a final financial activity report on the NMC Account covering the period from the date of the last NMC Account activity report provided under Section VII.G. through the date of the final disbursement of funds from the NMC Account.

IX. CONTACT INFORMATION/COMMUNICATIONS

- A. No obligations may be incurred, and no funds disbursed, except in accordance with the applicable Deposit Document(s). All approvals, notices and reports required or permitted under this Agreement shall be in writing and delivered by first-class mail, overnight mail, facsimile, or electronic pdf format. Each Party agrees to notify the other promptly after any change in named representative, address, telephone, or other contact information.
- B. All deposits made to the NMC Account by check shall be delivered to the Foundation's headquarters office at 1133 Fifteenth Street, NW, Suite 1000, Washington, D.C. 20005, to the attention of the Chief Financial Officer. All deposits made to the NMC Account by electronic funds transfer shall be made in accordance with wire instructions provided by Foundation in writing to the depositor.
- C. The individuals named below shall be the BLM Representative and the Foundation Representative for purposes of this Agreement. Contact information for the BLM Representative and Foundation Representative, respectively, is as follows (it being agreed and acknowledged that contact information for deposits to the NMC Account shall be as set forth in Section IX.B. above):

If to the BLM:

Deborah (Deblyn) Mead
National Mitigation Lead
Bureau of Land Management
2850 Youngfield Street
Lakewood, CO 80215
Phone: 202-494-7865
Facsimile: 303-239-3933
Email: dmead@blm.gov

BLM Alternate:

Laura Romin
National Threatened and Endangered
Species Program Lead
Bureau of Land Management
440 West, 200 South, Ste. 500
Salt Lake City, UT 84101
Phone: 385-214-7422
Facsimile: 801-539-4237
Email: lromin@blm.gov

If to the Foundation:

Eliza Braendel
Senior Manager, IDEA
National Fish and Wildlife Foundation
1133 Fifteenth Street N.W., Suite 1000
Washington, DC 20005
Phone: 415-593-7628
Facsimile: 202-857-0162
Email: eliza.braendel@nfwf.org

Foundation Alternate:

Anne Butterfield
Senior Manager, IDEA
National Fish and Wildlife Foundation
1133 Fifteenth Street N.W., Suite 1000
Washington, DC 20005
Phone: 415-243-3106
Facsimile: 202-857-0162
Email: anne.butterfield@nfwf.org

X. MISCELLANEOUS PROVISIONS


- A. No Assignment. No Party may assign this Agreement, in whole or in part, to any individual or other legal entity without the prior written approval of the other Party.
- B. Amendments. This Agreement may be amended only in writing agreed to and signed by all Parties.
- C. No Additional Support. In establishing the NMC Account, the BLM assumes no obligation to provide any funding or support to the Foundation in the implementation of this Agreement beyond the terms stated in this Agreement.
- D. Compliance with Laws; Insurance.
 - 1. The Foundation agrees to contractually require that all Recipients comply with all applicable Federal, State, and local laws, regulations, and ordinances and secure all appropriate and necessary public or private permits and consents in carrying out projects financed by the NMC Account.
 - 2. The Foundation agrees to contractually require Recipients to 1) obtain and maintain all appropriate insurance, with the Foundation and the BLM named as an additional insured to the extent practicable, against liability for injury to persons or property from any and all activities undertaken by such Recipients in carrying out projects financed by the NMC Account; and 2) defend and indemnify the Foundation and the BLM, and their respective officers, directors, agents, representatives, and employees, to the extent allowable by State or Federal law, in respect of any and all claims, injuries, losses, diminution in value, damages, liabilities, whether or not currently due, and related expenses (including without limitation, settlement costs and any legal or other expenses for investigating or defending any actions or threatened actions) arising from or in connection with such Recipients' performance of a project or activity financed by the NMC Account.
- E. Publicity. At the BLM's request, the Foundation agrees to require Recipients to include the BLM or applicable BLM Office's names or logos in all press releases, publications, annual reports, video credits, dedications, and other public communications regarding any of the projects financed with funds from the NMC Account.
- F. The Foundation may provide information about this Agreement and the subject matter hereof to the United States federal government in compliance with the Establishment Act.
- G. Severability. If any provision of this Agreement is held to be unlawful or invalid by any court of law with duly established jurisdiction over this Agreement, the Parties intend that the remainder of this Agreement shall remain in full force and effect notwithstanding the severance of the unlawful or invalid provision(s).

- H. Responsibility for Conduct. Each Party shall be responsible for the consequences of its own actions or inaction, willful misconduct, gross negligence, and/or breach of obligations in connection with this Agreement, and in connection with any work undertaken in accordance with this Agreement.
- I. Dispute Resolution. The Parties will cooperate in good faith to achieve the objectives of this Agreement and to avoid disputes. The Parties will use good faith efforts to resolve disputes at the lowest organizational level and, if a dispute cannot be so resolved, the Parties will then elevate the dispute to the appropriate officials within their respective organizations.
- J. Disclaimers. Unless otherwise directed by the BLM, the Foundation shall ensure that all information submitted for publication or other public releases of information regarding this Agreement or any project funded by the NMC Account shall carry the following disclaimer:
- The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies or opinions of the U.S. Government. Mention of trade names or commercial products does not constitute the endorsement by the U.S. Government.
- K. Appropriations Not Obligated. This Agreement establishes an elective process for Permittees to deposit funds into the NMC Account at the Foundation to pay the costs of Mitigation Activities and Administrative Costs to satisfy terms and conditions or other requirements identified by the BLM for the use of the public lands associated with the Permittee's authorization. Therefore, nothing in this Agreement may be construed to obligate the United States or any BLM Office to any current or future expenditure of money or resources either in advance of the availability of appropriations for such purposes from the U.S. Congress or other appropriating authority or when funds are available.
- L. No Limitation on BLM Responsibilities. Nothing contained in this Agreement is intended to limit the authority of the BLM to fulfill its statutory or regulatory responsibilities or to otherwise limit the powers afforded to the BLM by applicable law.
- M. No Third-Party Rights. This Agreement shall not be the basis of any claims, rights, causes of action, challenges, or appeals by any person or entity not a Party to this Agreement. Nothing in this Agreement shall be construed to create privity of contract between the BLM or the Foundation and any third parties, including Permittees and/or Recipients whose projects are financed by the NMC Account.
- N. Members of Congress Not to Benefit. No member of Congress shall benefit from the provisions of this Agreement.
- O. Duplicate Originals. This Agreement may be executed in any number of duplicate originals. A complete original of this Agreement shall be maintained in the official records of each of the Parties hereto.


- P. This Agreement excludes any obligation for the exchange of federal or state funds, supplies, equipment or services. Any such exchange or transfer shall be handled through instruments specifically used for those purposes.

The Parties have executed this Agreement as of the last date signed below.

UNITED STATES BUREAU OF LAND MANAGEMENT

By: **DAVID JENKINS**  Digitally signed by
DAVID JENKINS
Date: 2022.03.14
13:11:37 -06'00' Date: _____
David Jenkins
Assistant Director, Resources and Planning

NATIONAL FISH AND WILDLIFE FOUNDATION

By:  Date: March 15, 2022
Jeff Trandahl
Executive Director and Chief Executive Officer

ATTACHMENT1: Deposit Document

Attachment 1
BUREAU OF LAND MANAGEMENT
NATIONAL MITIGATION AND CONSERVATION ACCOUNT
DEPOSIT DOCUMENT

*Detailed instructions for properly completing this document are below (pp. 6-7).
The applicable BLM State Office is responsible for submitting this completed form to the National Fish and Wildlife Foundation (NFWF) when a project Permittee will be depositing funds with NFWF. Once the Deposit Document is completed the applicable BLM State Office shall submit it to NFWF, and should submit copies to the BLM Representative and the Permittee. The Permittee should include a copy with the deposit.*

PROJECT INFORMATION

Project Name:

Project Phase *(if applicable):*

Project Location *(State(s), County(ies)):*

Project Permittee *(and, if applicable, the parent company):*

Project Permittee Contact Information *(if available at time this form is submitted to NFWF):*

☐ **Decision Document Attached**

[insert name of Decision Document, date, and permit #]

Project Decision Document Identification/Tracking Number *(ePlanning NEPA #):*

BLM SUB-ACCOUNT INFORMATION

Check the applicable Sub-Account to which monies are to be deposited.

☐ **If this is the initial Deposit Document for Sub-Account establishment and the initial deposit, please check this box**

☐ **BLM [applicable name in checked box below] State Office Sub-Account**

☐ Alaska ☐ Arizona ☐ California ☐ Colorado ☐ Idaho ☐ Montana ☐ Nevada

☐ New Mexico ☐ Oregon-Washington ☐ Utah ☐ Wyoming ☐ Eastern States

☐ **Flat-Tailed Horned Lizard Conservation Sub-Account**

☐ **Arizona Desert Tortoise Mitigation Sub-Account**

☐ **Nevada Desert Tortoise Mitigation Sub-Account**

Name of BLM State Office Sub-Account Representative:

BLM State Office(s):

BLM District Office(s) (if applicable):

BLM Field Office(s) (if applicable):

Name of BLM Contact Person(s):

MONIES REQUIRED FOR DEPOSIT:

Check the applicable box below and specify the dollar amount(s) for deposit.

☐ **BLM [applicable name in checked box above] State Office Sub-Account Deposit**

Mitigation Activities	\$ _____
NFWF Deposit Fee (\$3,400 to be paid by initial depositor)	\$ _____
NFWF Annual Fee (estimated)	\$ _____
NFWF RFP Fee (\$30,000 (2022 dollars), as adjusted by CPI, consult NFWF for amount prior to deposit)	\$ _____

☐ **Flat-Tailed Horned Lizard Conservation Sub-Account Deposit**

Mitigation Activities	\$ _____
NFWF Deposit Fee (\$3,400 to be paid by initial depositor)	\$ _____
NFWF Annual Fee (estimated)	\$ _____
NFWF RFP Fee (\$30,000 (2022 dollars), as adjusted by CPI, consult NFWF for amount prior to deposit)	\$ _____

☐ **Arizona Desert Tortoise Mitigation Sub-Account Deposit**

Mitigation Activities	\$ _____
NFWF Deposit Fee (\$3,400 to be paid by initial depositor)	\$ _____
NFWF Annual Fee (estimated)	\$ _____
NFWF RFP Fee (\$30,000 (2022 dollars), as adjusted by CPI, consult NFWF for amount prior to deposit)	\$ _____

☐ **Nevada Desert Tortoise Mitigation Sub-Account Deposit**

Mitigation Activities	\$ _____
NFWF Deposit Fee (\$3,400 to be paid by initial depositor)	\$ _____
NFWF Annual Fee (estimated)	\$ _____
NFWF RFP Fee (\$30,000 (2022 dollars), as adjusted by CPI, consult NFWF for amount prior to deposit)	\$ _____

TOTAL DEPOSIT for Project (or Project Phase) \$ _____

☐ **Prior Deposit Document(s) submitted for previous deposit(s) for this same project:**
(check and complete, if applicable)

Project Phase: _____ **Deposit:** \$ _____

Project Phase: _____ **Deposit:** \$ _____

Project Phase: _____ **Deposit:** \$ _____

SUB-ACCOUNT MITIGATION ACTIVITIES DETAILS:

Check the applicable box(es) below for the Sub-Account(s) that is/are to receive monies and provide the required information. See the instructions below before completing this section.

☐ **BLM [applicable name in checked box above] State Office Sub-Account Mitigation Activities:**

1. Description of Mitigation Activities *(See instructions below before filling in this section.):*
2. Citation (e.g., page, section, condition number) to Applicable Decision Document(s)
(These documents must be provided to NFWF at time of submission of Deposit Document.):
3. Implementation Schedule *(including determination of start date, performance period, and due date and determination method for satisfaction of mitigation requirements):*
4. BLM Contact Person and Information:
[insert BLM Office]
[insert BLM Contact Person's Name}
[insert BLM Office Address]
[insert Phone Number]
[insert Email Address]

☐ **Flat-Tailed Horned Lizard Conservation Sub-Account Mitigation Activities:**

☐ **East Mesa** ☐ **West Mesa** ☐ **Arizona (Yuma)**

1. Description of Mitigation Activities *(See instructions below before filling in this section.):*
2. Citation (e.g., page, section, condition number) to Applicable Decision Document(s)
(These documents must be provided to NFWF at time of submission of Deposit Document.):

3. Implementation Schedule *(including determination of start date, performance period, and due date and determination method for satisfaction of mitigation requirements)*:
4. BLM Contact Person and Information:
[insert BLM Office]
[insert BLM Contact Person's Name}
[insert BLM Office Address]
[insert Phone Number]
[insert Email Address]

☐ **Arizona Desert Tortoise Mitigation Sub-Account Mitigation Activities:**

- ☐ **Sonoran Desert Tortoise** ☐ **Mojave Desert Tortoise**

1. Description of Mitigation Activities *(See instructions below before filling in this section.)*:
2. Citation (e.g., page, section, condition number) to Applicable Decision Document(s) *(These documents must be provided to NFWF at time of submission of Deposit Document.)*:
3. Implementation Schedule *(including determination of start date, performance period, and due date and determination method for satisfaction of mitigation requirements)*:
4. BLM Contact Person and Information:
[insert BLM Office]
[insert BLM Contact Person's Name}
[insert BLM Office Address]
[insert Phone Number]
[insert Email Address]

☐ **Nevada Desert Tortoise Mitigation Sub-Account Mitigation Activities:**

- ☐ **Southern Nevada District Office** ☐ **Lincoln County**

1. Description of Mitigation Activities *(See instructions below before filling in this section.)*:
2. Citation (e.g., page, section, condition number) to Applicable Decision Document(s) *(These documents must be provided to NFWF at time of submission of Deposit Document.)*:
3. Implementation Schedule *(including determination of start date, performance period, and due date and determination method for satisfaction of mitigation requirements)*:
4. BLM Contact Person and Information:
[insert BLM Office]
[insert BLM Contact Person's Name}
[insert BLM Office Address]

[insert Phone Number]
[insert Email Address]

BLM Representative Approval: *(If this is the initial Deposit Document for the Sub-Account establishment and initial deposit, BLM Representative to sign and date this form prior to its submission to NFWF):*

- ☐ **This Deposit Document has been checked for completeness by the BLM Representative**
- ☐ **The BLM elects to designate the BLM State Office Sub-Account Representative below to function as the BLM Representative for purposes of this Sub-Account** *(check if applicable):*

(Name)

Date

Email:

Phone:

BLM State Office Representative Approval:

- ☐ **This Deposit Document has been checked for completeness by the BLM [insert State name] State Office Sub-Account Representative** *(BLM State Office Sub-Account Representative to sign and date this form prior to its submission to NFWF):*

(Name)

Date

Email:

Phone:

DEPOSIT DOCUMENT INFORMATION & INSTRUCTIONS

The Deposit Document is used for internal purposes by the Bureau of Land Management (BLM) and the National Fish and Wildlife Foundation (NFWF). The Deposit Document is not itself a Decision Document.

The Deposit Document is to be filled out by the appropriate BLM Office staff (i.e., the representative staff person with knowledge of the project in the BLM office responsible for issuing the Decision Document). The BLM Office staff who takes the lead in preparing the Deposit Document shall coordinate with the BLM Representative and/or their BLM State Office Sub-Account Representative, as applicable, and NFWF staff prior to finalizing the Deposit Document. If it is the initial Deposit Document for the Sub-Account establishment and initial deposit, the BLM Representative is to sign and date the Deposit Document prior to its submission to NFWF). The BLM Representative and/or BLM State Office Sub-Account Representative, as applicable, is/are responsible for checking the Deposit Document for completeness. Once the Deposit Document is completed and signed by the BLM Representative and/or BLM State Office Sub-Account Representative, as applicable, it will be submitted to NFWF. After NFWF has verified its receipt and accuracy, a copy should be submitted to the Permittee. The Permittee should be instructed to include a copy of the Deposit Document with the deposit.

Instructions for Preparing the Deposit Document:

- ☐ Complete the **Project Information** section of the Deposit Document. Note that a copy of the Decision Document must be attached to the copy of the Deposit Document submitted to the Foundation.
- ☐ Complete the **BLM Sub-Account Information** section of the Deposit Document. Identify any BLM District or Field offices involved with the land use authorization for the project. If a Field Office is the responsible BLM Office for completing the Deposit Document, the BLM State Office Sub-Account Representative should ensure that the applicable District Office also receives a copy of the completed, signed Deposit Document.
- ☐ Complete the **Monies Required for Deposit** section of the Deposit Document. There are twelve non-resource-specific BLM State Office Sub-Accounts (one Sub-Account for each State Office) and three resource-specific Sub Accounts approved for establishment under the BLM National Account. For each Sub-Account, there is a one-time Deposit Fee to establish the Sub-Account and an Annual Fee. The one-time Deposit Fee will be paid by the initial depositor. The Annual Fee is the greater of three percent (3%) of the funds under management in the Sub-Account or One Thousand Dollars (\$1,000). The first line is the amount of funds to be deposited for the “Mitigation Activities.” The second line is the amount of funds to be deposited for the NFWF Deposit Fee; this applies only to the initial depositor. The third line is for an estimated amount of funds to be deposited for the NFWF Annual Fee for each year BLM anticipates the monies will exist in the Sub-Account. The

fourth line is the amount of funds to be deposited for an RFP if the BLM chooses to have NFWF conduct a RFP process to accomplish the Mitigation Activities (e.g., a habitat restoration/improvement project). The NFWF RFP Fee is \$30,000 (2022 dollars), as adjusted by CPI.

1. Check the box next to each Sub-Account that is to receive monies for Mitigation Activities for the permitted project or project phase(s). For BLM State Office Sub-Accounts, check the box next to the applicable BLM State Office.
2. Specify the dollar amount to be deposited into each such Sub-Account for Mitigation Activities.
3. Specify the dollar amount to be deposited into each such Sub-Account for any applicable Deposit Fee, Annual Fee, or RFP Fee. (Contact NFWF with any questions about whether any such fees are applicable, and the amount of the RFP Fee, if applicable.)
4. Add the dollar amounts described above and provide the “TOTAL DEPOSIT” dollar amount to be received from or on behalf of the Permittee.
5. If the deposit is for a project that made one or more deposits for a prior phase of the same project, check the “Prior Deposit Document” box and specify the previous phase and dollar amount deposited.

☐ Complete the **Sub-Account Mitigation Activities Details** section of the Deposit Document.

1. Describe the Mitigation Activities to be conducted with the monies deposited. Identify the resource(s) requiring mitigation, the type of mitigation to be accomplished (e.g., land acquisition, habitat restoration/enhancement/improvement, invasive species treatment, or any short-term management/monitoring of the mitigation area), the acreage totals, and any other applicable information.

If the monies to be deposited are for long-term management/monitoring of the project or mitigation area, are intended to fund a management endowment or other long-term conservation requirement, contact the BLM Representative and NFWF staff to discuss whether an additional Sub-Account with a long-term investment strategy is needed BEFORE submitting the Deposit Document.

2. Include the citation (e.g., page, section, condition number) to the applicable Decision Document(s). Note that a copy of the Decision Document must be provided to NFWF at time of submission of Deposit Document.
3. Specify the implementation schedule, including determination of start date, performance period, and due date, and determination method for satisfaction of mitigation requirements (i.e., performance criteria).
4. Provide the name of the BLM Contact Person for the Project and their contact information. This person will coordinate with NFWF to ensure expenditures from the Sub-Account are in accordance with the Decision Document.

- ☐ Submit the completed Deposit Document to the **BLM Representative and/or BLM State Office Sub-Account Representative**, as applicable, for review and signature prior to submitting it to NFWF. After NFWF has verified its receipt and accuracy, a copy may be submitted to the Permittee.